

JPRS 76022

10 July 1980

Worldwide Report

ENVIRONMENTAL QUALITY

No. 259

FBIS

FOREIGN BROADCAST INFORMATION SERVICE

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service, Springfield, Virginia 22161. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semi-monthly by the National Technical Information Service, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Indexes to this report (by keyword, author, personal names, title and series) are available from Bell & Howell, Old Mansfield Road, Wooster, Ohio 44691.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

10 July 1980

WORLDWIDE REPORT
ENVIRONMENTAL QUALITY

No. 259

CONTENTS

WORLDWIDE AFFAIRS

Briefs		
	Antarctic Environmental Protection Pact	1
	ASIA	
AUSTRALIA		
Briefs		
	West Australian Salinity Problem	2
	Funds for Conservationists	2
INDIA		
	Gandhi Outlines Plan To Protect Ecology (THE TIMES OF INDIA, 28 Apr 80)	3
NEW ZEALAND		
	Environmental Council Seeks Coastal Management Guidelines (THE NEW ZEALAND HERALD, 31 May 80)	5
	Government Board Says Herbicide 2,4,5-T Safe To Use (THE EVENING POST, 14 Jun 80)	6
PEOPLE'S REPUBLIC OF CHINA		
	Activities Publicize Environmental Protection Month (Guo Jicai; WEN HUI BAO, 24 Mar 80)	7
	Further Efforts To Control Guilin Pollution Vital (Wang Dengsan, Gui Tinggong; GUANGMING RIBAO, 28 Mar 80)	9

Clearing Pollution From Bohai, Yellow Sea (Sun Jun; GUANGMING RIBAO, 28 Mar 80)	13
Oil Pollution Off Shandong Coast Brought Under Control (Zhu Jianzhong, Sun Liping; GUANGMING RIBAO, 28 Mar 80)	15
Protecting Forest Cover of 'San Rei' Region Urged (Du Yali; GUANGMING RIBAO, 27 Mar 80)	17
Briefs	
Pollution Control	19
Environmental Protection	19
Ship Sewage Treatment	20
Waste Water Treatment	20
Biosphere Preserves Designated	20
Experimental Sewage Treatment Plant	21
Farmland in Xi'an Suburbs Polluted	21

THAILAND

Phetchabun Watershed Forest Destroyed (BAN MUANG, 10 Apr 80)	22
-----------------------------------------------------------------------	----

EAST EUROPE

POLAND

Environmental Protection Policy, Development Described (Bogdan Poplawski; GOSPODARKO PLANOWA, Mar 80)	24
Environmental Protection, Danger of Wisla River Described (Marian Grzesiak, Jolanta Kida-Kowalczyk; WIADOMOSCI STATYSTYCZNE, May 80)	46

LATIN AMERICA

CUBA

Environmental Problems in Havana Province Examined (Uvelino Moreno Jimenez, T.S. Raul Leon Benitez; REVISTA CUBANA DE HIGIENE Y EPIDEMIOLOGIA, Sep-Dec 79)	60
---------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----

SUB-SAHARAN AFRICA

NIGERIA

Environmental Protection Law Drafted (NEW NIGERIAN, 6 Jun 80)	70
------------------------------------------------------------------------	----

SOUTH AFRICA

- White Paper on Environmental Conservation Issued
(THE CITIZEN, 14 Jun 80) 71

ZAMBIA

- Launching of Afforestation Project Reported
(TIMES OF ZAMBIA, 19 Jun 80) 72

USSR

- Sokolovsky Comments on Cost, Need for Environmental
Protection
(Valentin Sokolovsky Interview; MOSCOW NEWS,
No 22, 1980) 73

WEST EUROPE

INTERNATIONAL AFFAIRS

- Nordic Manufacturers Weigh Common Toxic Waste Site
(HUFVUDSTADSBLADET, 22 May 80) 77

FINLAND

- Briefs
Mercury Danger Discounted 79

NORWAY

- Storting Grants Funds for Ocean Floor Oil Damage Study
(NORDISK KONTAKT, 22 Apr 80) 80

SWEDEN

- Riksdag Committee: Halt Cadmium Increase in Soil
(DAGENS NYHETER, 30 May 80) 82

- Seal Population Rises in Gulf of Bothnia
(DAGENS NYHETER, 5 Jun 80) 84

- Briefs
Oil Spill Clean Up 86

BRIEFS

ANTARCTIC ENVIRONMENTAL PROTECTION PACT--Canberra, May 20 (AFP)--The entire area south of the Antarctic convergence is to be treated as a single ecosystem under a new international convention signed here today. The Australian minister for productivity, Mr Kevin Newman, described the convention, signed by 15 countries, as a "landmark in the fulfillment of our shared responsibilities for the environmental protection of Antarctica." It allows for the establishment in Hobart, Australia's closest city to the Antarctic, of a commission on the conservation of Antarctic marine living resources. The foreign minister, Mr Andrew Peacock, said in Parliament today that the decision to choose Hobart as the site was recognition of Australia's role in promoting the convention. The convention will be open for signature in Canberra between August and December 1980 and will come into force when eight states have ratified it. [Excerpts] [OW200851 Hong Kong AFP in English 0755 GMT 20 May 80]

CSO: 5000

AUSTRALIA

BRIEFS

WEST AUSTRALIAN SALINITY PROBLEM--The State Government will not divert the headwaters of the Tone and Upper Kent rivers in the South-West because of the cost and environmental problems. The Premier, Sir Charles Court, said yesterday that Cabinet had decided instead that alternative means should be developed to control salinity. He was commenting on the release of the preliminary report of a Public Works Department study into the feasibility of the diversion scheme as a means of controlling salinity in the Warren and Kent rivers. The Tone is a tributary of the Warren River. Sir Charles said that it was clear from the study that the diversion scheme would raise complex environmental problems that were likely to be difficult to resolve. Sir Charles said the PWD report indicated that most of the salinity in the Kent and Tone rivers came from their headwaters which were in relatively low-rainfall areas. Salts that had built up in the soil over many years were being flushed into the rivers. A great deal more investigation would be needed before river diversion could be evaluated against other alternatives or before removal of the existing land-clearing controls in the Kent and Tone catchments could be considered. [Excerpts] [Perth THE WEST AUSTRALIAN in English 17 May 80 p 9]

FUNDS FOR CONSERVATIONISTS--Canberra.--A Federal Government committee recommended yesterday that the Government consider increasing grants to voluntary conservation organisations in Australia. The recommendation was from the House of Representatives standing committee on environment and conservation, which was established in October last year. The committee said voluntary conservation organisations contributed to reasoned public debate, to public education and an increasing public awareness of environmental issues. The committee recommended: That Commonwealth funds be provided to voluntary conservation organisations (other than environment centres) with a \$2 for \$1 matching requirement up to the amount allocated to each group; that Commonwealth funds be provided to the environment centre in each state capital and in large regional centres with no requirement to match the allocated amount. Other recommendations included a proposal that a fund be established to assist voluntary conservation organisations with specific projects. The committee also asked the Federal Government to establish a special research fund to be allocated by the minister to sponsor research projects by professional consultants and researchers on the basis of advice received from voluntary conservation organisations. [Text] [Sydney THE SYDNEY MORNING HERALD in English 16 May 80 p 4]

CSO: 5000

GANDHI OUTLINES PLAN TO PROTECT ECOLOGY

Bombay THE TIMES OF INDIA in English 28 Apr 80 p 5

[Text] New Delhi, April 27 (PTI): The Prime Minister has stated that the maintenance of the ecological balance should be as much a part of the developmental process as the utilisation of national resources.

In a letter to the chief ministers, governors and lt.-governors, Mrs Gandhi has urged them personally to devote time to measures for the preservation of the environment.

Recalling the numerous reports and complaints about the denudation of forests and depredation of wild life, Mrs Gandhi said that many forests with precious species of plants had been thoughtlessly leased out to forest contractors, who were concerned with immediate profits. Together with poachers and smugglers of animal skins, they had chipped away steadily at many of the sanctuaries and forest reserves.

The letter says that efforts to preserve our environment were a joint responsibility of the Centre and the states and, in fact, of all right-thinking people. At the Centre, a committee had already been set up to suggest legislative and administrative measures to maintain the ecological balance, she said.

Mrs Gandhi pointed out that the major effort at the field level had to come from the state governments and specific and immediate action should be taken by the state governments to check the activities of forest contractors and poachers, while making determined attempts to extend the area under forests and vegetative cover.

To this end, she suggested the following specific measures:

1. Officers with the right attitude, should be posted in reserved forests and sanctuary areas. If possible, a special corps of such officers could be identified for duties relating to wildlife and forest and environment conservation.

2. Forest development corporations or similar agencies should be asked to take up plantations on steep hill sites, catchment areas and clear-felled forest areas so that productive forestry and protective forestry go hand in hand.
3. A massive programme of social forestry should be taken up both under the food for work programme and under other specific schemes. The waste lands in villages, all community lands, field bunds, canal bunds etc, could be clothed with fast-growing species under this useful scheme.
4. In areas where the tribals depend heavily on forests for their livelihood, they should be involved in replanting the species that they are already exploiting. A scheme of forest farming should be undertaken. Particular attention should be paid to the replanting or fresh planting of fruit trees.
5. The existing regulations and security arrangements in sanctuaries should be tightened. Poaching should be dealt with very severely.
6. Intelligence machinery to detect smuggling of valuable species like red sanders and sandalwood, or of animal furs and skins should be strengthened and personal interest should be shown by top people in administration to see that such activities were ruthlessly suppressed.
7. The system of contracting away forest areas should be replaced or modified to see that every tree felled should be replaced by the planting of at least another one if not more.
8. Tree plantation programmes should be undertaken by schools and other institutions. Some countries had initiated a programme of a tree for every child.
9. Serious attempts should be made to change the orientation of all persons working in the forest services and forest administration with a system of rewards and incentives for those who did better in preserving or extending the forest or wildlife areas.

CSO: 5000

ENVIRONMENTAL COUNCIL SEEKS COASTAL MANAGEMENT GUIDELINES

Auckland THE NEW ZEALAND HERALD in English 31 May 80 p 3

[Report by HERALD's Wellington Bureau]

[Text]

The Environmental Council says guidelines and national policies for coastal development and management are required.

In a report to the Minister for the Environment, Mr V. S. Young, the council says there is a compelling need to protect the many millions of dollars invested in facilities and structures on coastal lands.

"Recent experience at Omaha, Raumati, Maraden Pt and elsewhere indicates that in addition to social and environmental hazards, some of this investment will be at risk, and the need for anticipatory planning is paramount," says the council in the report, released today.

It says coastal planning should be formulated for coastal zone management, and that there should also be an improvement in the gathering and dissemination of relevant information.

Pressures

While the council says the Government's 1973 policy principles on coastal land remained valid, it adds there is still scope for some amendment.

The report asks whether new pressures are emerging, such as energy-related developments, a petrochemical industry, port expansion and development, mining operations and tourism resort development.

"It is a matter of concern that policies and objectives for tourism in New Zealand are not clearly defined, leading to difficulties in assessing the viability and desirability of resort proposals," it says.

Development of the Maui gasfield onshore processing and further exploration would bring new pressures to bear on the coastal zone, but there was still time to plan for them.

Among the council's recommendations is one calling for the co-ordination of the collection and dissemination of information.

It also calls for the establishment of a task force to survey coastal and marine resources in Northland. That would lead to a pilot planning exercise in the area combining various local and regional planning authorities.

Policies

A co-ordination of activities of government agencies involved in coastal zone management and consultation with relevant organisations leading to national policies is also recommended.

Mr Young said he would study the report's conclusions and recommendations more closely and would also draw it to the attention of various government ministers and agencies.

However, he said it was clear that further study would be needed to bring about concrete proposals.

Mr Young said he hoped that interested parties, especially developers, planners, and the general public, would study the report closely, and he would welcome any informed comments or submissions which people wished to make.

GOVERNMENT BOARD SAYS HERBICIDE 2,4,5-T SAFE TO USE

Wellington THE EVENING POST in English 14 Jun 80 p 44

[Text] An official study has given yet another clearance to the controversial weedkiller 2,4,5-T.

Critics of the chemical have claimed that a substance called dioxin an impurity in 2,4,5-T, is responsible for birth defects in children and for cancer.

However a statement today from the Agricultural Chemicals Board in Wellington declares that 2,4,5-T is safe when used in accordance with label directions.

The study, which involved a comprehensive review of New Zealand and overseas data, showed that the levels of dioxin in New Zealand-made 2,4,5-T were probably not high enough to cause health problems, the board chairman (Mr Percy Clark) said.

The board's declaration on 2,4,5-T follows growing pressure from environmental action groups to have use of the chemical stopped, while the manufacturers of the chemical in New Zealand, Ivon Watkins Dow, have hired public relations

consultants to stress the benefits of 2,4,5-T.

The controversy is linked to the row over the Vietnam War defoliant Agent Orange, of which 2,4,5-T was a part. The Director General of Defence Medical Services (Air Commodore L J Thompson) said earlier this week that chloracne (a severe pustular skin condition) was the only disease confirmed to be the result of dioxin exposure.

The Agricultural Chemicals Board study cited studies in Vietnam, Arizona, Lapland, Australia and New Zealand which had shown no link between 2,4,5-T and deformities in children.

The percentage of abnormalities in 800 children born after the accidental release of two kilograms of dioxin near Seveso in Italy was below the national average.

Contamination of surface water or water supplies by

dioxin was unlikely, the board said, because dioxin was almost insoluble in water.

"Studies on mice, rats and monkeys showed that a pregnant woman weighing 50kg could absorb up to 1.5 litres of ready-to-use spray daily without likely effect of dioxin on the developing fetus," Mr Clark said.

"Studies of health of workers in the USA exposed to 2,4,5-T during manufacture have shown no evidence of excess in total mortality or deaths from malignant tumours or diseases of the circulatory system."

He said some studies had shown evidence of cancers among workers and applicators elsewhere in the world.

The Department of Health is funding a study in New Zealand of registered chemical applicators to see if they have more birth defects in their families than other comparable groups.

PEOPLE'S REPUBLIC OF CHINA

ACTIVITIES PUBLICIZE ENVIRONMENTAL PROTECTION MONTH

Shanghai WEN HUI BAO in Chinese 24 Mar 80 p 3

[Article by Guo Jicai [6665 4764 2088]: "Shanghai Expands Environmental Protection Work"]

[Text] Activities of National Environmental Protection Propaganda Month are currently being launched in the city.

For the purpose of propagandizing environmental protection methods and strengthening the work of popularizing environmental science, activities connected with environmental protection propaganda month are being launched during March and April all over the country. On 7 March, the municipal government held a staff meeting to arrange the activities. Afterward, the districts, some counties, and bureaus began to launch the activities according to local conditions. The revolutionary committees of Huangpu, Jingan, Pudu, and Baoshan districts and counties organized the forces of the departments of propaganda, culture, environmental protection, and scientific cooperation for closely coordinated activities on behalf of the propaganda month. Municipal bureaus of handicrafts, textiles, and chemical industries called their respective company managers and environmental protection staff to meetings to discuss ways of carrying out environmental protection work in their respective systems. The leaders of the municipal handicraft industry seriously analyzed the problems in current environmental protection work, adopted reform measures, and adjusted production directions in order to resolve these problems step by step. The leaders of the Bureau of Chemical Industries brought their own work to related companies and factories so as to strengthen environmental protection work.

Environmental protection month propaganda activities are being carried out in the city in many ways. Picture galleries and exhibitions are used in Jingan District and Nanshi District. These pictures are being circulated in factories and on the streets. Many factories and residential committees also organized the masses to read newspaper articles or watch television programs. In Chuansha and Fengxian counties, large meetings using wire broadcasting were held. The bureaus of textiles and of metallurgy, as well as Jingan District, called meetings to praise advanced units and individuals in environmental protection.

In order to strengthen environmental protection work, a small number of districts, counties, and bureaus reinforced their environmental protection organizations to coordinate full-time specialists and part-time workers to form an environmental protection staff. In Nanshi District, the various residential committees established and reinforced mass environmental monitoring teams. The leaders of Jiading County went to seriously polluted areas such as Changxiang and Nanxiang to carry out propaganda and inspection work in the factories. Some of these factories were also given deadlines for adopting certain remedial measures. In Huangpu District, it was decided that smoke from 145 furnaces in the areas of Nanjing Road, Central Shandong Road, and Xizang Road Centre Section is a problem that must be resolved before 1 May. For the purpose of resolving the problem of environmental pollution, the Shanghai No 11 Dyestuff Plant formulated its own rules of environmental protection. The Shanghai No 5 Dyestuff Plant, the Gaoqiao Chemical Plant, etc., made reports to all their employees on the status of pollution and environmental monitoring data for the purpose of soliciting policies and opinions from the masses.

FILE

CSO: 5000

PEOPLE'S REPUBLIC OF CHINA

FURTHER EFFORTS TO CONTROL GUILIN POLLUTION VITAL

Beijing GUANGMING RIBAO in Chinese 28 Mar 80 p 2

[Article by Wang Dengan [3769 4098 0005], State Council Environmental Protection Office, and correspondent Gui Tingong [2710 2185 1562]: "Another Appeal: 'Save Guilin.' Investigation of the Problem of Controlling Pollution in Guilin"]

[Text] On 4 February 1979, GUANGMING RIBAO published an investigative report titled, "Save Guilin," which told of the serious pollution of the city of Guilin. Thirteen months have passed, so how is pollution control faring in Guilin? Recently we made another investigation of the problem of controlling pollution in Guilin.

As a step toward solving the pollution problem in Guilin, the Guangxi-Zhuang Autonomous Region and Guilin city closed down the Guilin No 2 Electric Power Plant, the smelters at the Guilin Steel Plant, and the paper pulp and refractory materials shops at the Guilin Paper Plant. As a result of the closings of these several polluting plants and workshops, the discharge into the Li River of polluted water and coal ash has been reduced somewhat. A comrade in position of responsibility in the CCP Committee of the autonomous region has gone to Guilin to lead the masses in a cleanup of the coal ash in the polluted Nanxi River, and the scenic beauty of Nanxi Mountain has been virtually restored.

Pollution Is Still Very Serious

Nevertheless, pollution in Guilin is still very serious. The waters of the Li River, the Taohua River, the Xiaodong River, and Rongshan Lake in the middle of the city are still not clean. An oil slick floats on their surfaces, they are covered with a white scum, they glisten with grime, and their stench is overwhelming. Monitoring by units concerned shows no decline in the chemical toxin content over that of a year ago for the river water, ponds, farmlands, or underground water. There has been a 41.7-percent increase over the same period last year in the detection rate of mercury, and the quantities of fluoride and sulfide are also greater than last year. Downriver from the Liuhe Bridge over the Xiaodong River, oxygen consumption

is 112.4 milligrams per liter; dissolved oxygen in the water downriver from the Longyin Bridge is zero, and oxygen consumption is 42.48 milligrams per liter. As compared with the same period in 1978, a great decline has occurred in the amount of dissolved oxygen. The minimum detected value was 1 milligram per liter, which shows that the water does not provide sufficient oxygen for organisms to survive. (Fish require 4 milligrams of oxygen per liter of water to survive.) Other indices of pollution show ammonia, nitrates, nitrogen, and iron all on the rise.

Noise pollution in Guilin is also extremely serious. Noise levels at the intersections of several thoroughfares, such as at Nanmen Bridge, Yan Bridge, Shilai Street, both approaches to Jiefang Bridge, the Special District Building, and on Sihui Road reaches 70 decibels, which is about five times the statistical sound level for Shanghai. Guilin's environmental sanitation is also a mess. The streets are dirty; residents dump garbage indiscriminately; and garbage is slowly filling the rivers and ponds.

Because of serious pollution from chemical plants in the area of Dafeng Mountain, the mountain's rocks have turned white, the trees have withered, and the ecological system has been utterly destroyed. People have wantonly leveled the steep and lofty peaks that line both shores of the Li River to quarry stone, and they have felled trees, causing enormous erosion. At the present time, unbelievably, not a single undamaged park exists in all of Guilin.

Reasons for Slowness in Control

Does the slow pace of pollution control in Guilin result from lack of funds? Not at all. On 8 January last year, after the State Council had issued a document setting forth three principles to guide control of pollution in Guilin, it especially disbursed 5.915 million yuan as an investment for cleaning up the environmental pollution in Guilin, and the autonomous region also set aside an additional 43,000 yuan in special funds for the same purpose. This, plus the 1,512,500 yuan of special funds carried over into 1979 from 1978, plus the 190,000 yuan put up by industrial plants themselves, amounted to a total of 8,020,500 yuan. Last year, however, actual financial expenditures were only 2,077,400 yuan, or just 25 percent of total funds provided. Why have the large sums of money for pollution control not been spent? The reason is that the Guilin Municipal CCP Committee did not place the cleanup of Guilin's pollution on its daily agenda of things to do. It made a few studies and did a little checking, but there was very little supervising or prodding. Early last year, following issuance of the State Council document, the city decided that a group of industrial plants should control pollution for a period of time, but they did not stipulate any time limit. Some production technologies that were to close down, according to regulations, resumed operations in the name of completing their output goals. The State Council document stipulated: "Henceforth, no further new construction or expansion of existing construction of any industrial plant will be permitted within the Guilin scenic zone." Nevertheless, last year one industrial plant, whose existing pollution had not been brought under control,

added on a new textile print and dye shop. Year after year some plants sought funds for environmental protection, but once they obtained the money, delay after delay ensued in pollution control work. In some plants, pollution control equipment was not put to use once it had been built, or else good care was not taken of it, with the result that it could not fulfill its function in controlling pollution. Some newly built units did not observe regulations pertaining to built-in means of handling the "three wastes" [waste gas, waste water, and industrial residue] as part of the construction of the plant proper in a program of "three concurrents." This lack of coherence in installation risked creation of new sources of pollution. For example, pollution in Hongshan Lake in the middle of the city is frightful; an engineering project for channeling the water was completed long ago, yet it has been of no use whatsoever. The asphalt plant beside the lake was supposedly moved a long time ago, but in fact, it has not moved. On the other hand, some plants, such as the Guilin Electric Circuit Devices Plant, have for several years sought to move in order to control pollution, only to find no support from the Municipal CCP Committee. All of this shows that the leadership in Guilin has not taken very vigorous action to control pollution.

Several Recommendations

Demands from the broad masses of people and from basic-level cadres in Guilin for the control of pollution in Guilin have been extremely urgent. There is a strong desire for improvement in working conditions and the living environment. They have made the following several recommendations for future pollution control in Guilin.

First, on every echelon in leadership units, and particularly in the Guilin Municipal CCP Committee, there should be sufficient recognition of the special significance of preserving Guilin's scenery. Guilin's scenery is an extremely precious treasure of the Chinese people. While pondering production, it is necessary, first of all, to give real consideration to the maintenance of Guilin's scenery.

Second, organize a general war to speed control of the sources of pollution. There are too many bandit projects operating in defiance of environmental protection in Guilin. Year after year the government provides funds, but no ability to control pollution derives from them. Strong measures must now be taken, with an organization of forces from pertinent quarters to bring about rapid action in controlling polluting projects, one by one, and to rapidly bring the sources of pollution under control. At the same time close attention must be paid to management, and the masses must be stimulated to improve backward production technology and equipment with big efforts toward comprehensive utilization, conversion of junk into something valuable, fullest economy in energy and resources, and institution of civilized production.

Third, there has to be conscientious study and regulation of industrial organizations and dispersal of industry in Guilin. Those plants and enterprises that do not fit in with the building of Guilin into a socialist, modernized, scenic tourist city will have to be moved in a planned way, and steps will have to be taken to develop nonpolluting industries that serve scenic sightseeing, such as electronics, instruments, clothing, and industrial arts.

Fourth, include prevention and control of pollution as part of production plans, and combine economic and administrative methods. When units concerned issue production plans, these plans should contain specific requirements for pollution prevention and control, with an overall balance between industrial and agricultural and other economic plans, and for planning as a whole, so that environmental protection work may be smoothly carried out. Through economic methods, a more intimate relationship should be brought about between environmental protection work and all units engaged in economic activities, the economic management of departments responsible for work, economic accounting, and actual benefits. Economic methods such as trial implementation of fines for discharge of pollutants in excess of permissible levels and fines for pollution mishaps, as well as administrative methods such as fixed periods of time to effect control, should be required.

Fifth, build up the environmental protection system itself, with a strengthening of environmental monitoring and an intensification of environmental research, so that environmental protection work will serve the function it should in protecting the Guilin scenic area.

"The mountains and waters of Guilin are the finest under heaven." Our country has only one Guilin. Those concerned should establish an overall viewpoint and, from a high sense of responsibility to the people, give full attention to fundamental control of pollution in the Guilin scenic area in order to rapidly restore its beautiful appearance.

9432

CSO: 5000

CLEARING POLLUTION FROM BOHAI, YELLOW SEA

Beijing GUANGMING RIBAO in Chinese 28 Mar 80 p 2

[Article by Sun Jun [1327 6874]: "Gradually Transforming Bohai and the Yellow Sea Into Clean Waters. Symposium To Exchange Experiences on the Present State of Pollution in Bohai and the Yellow Sea Convened at Jinxi"]

[Text] In order to give impetus to the prevention and control of pollution in Bohai and the Yellow Sea, the Bohai and Yellow Sea Waters Protection Leadership Group Office convened an experience-exchange symposium on site at the No 5 Petroleum Plant in Jinxi, Liaoning Province, in early March. At the symposium, the No 7 Union of the Jinxi No 5 Petroleum Plant gave a briefing on the experiences of the enterprise's environmental protection management work.

Bohai and the Yellow Sea are the major protective waters of our country. Their coastal areas have countless large industrial plants, harbors, and oil-fields. How well these units handle the "three wastes" (waste gas, waste water, and industrial residue) directly influences the environment of these bodies of water. In 1978 the Jinxi No 5 Petroleum Plant stressed its solution to the problem by improving its waste removal pipe network. It did this by separating the clear water and the dirty water for discharge, reducing the quantity of waste discharged, and building a preliminary oil separation, flotation, aeration, and gravel filter system to control polluted water. In 1979, the amount of oil in discharged waste water was 60 percent less than formerly and more than 2,000 tons of dirty oil were recovered. At the same time, they instituted multiple use of clay oil sludge, wax residue, and acid residue. The recovery rate of machine oil from clay oil sludge is 83 percent, the white paraffin recovery rate from wax residue is 70 percent, and the recovery rate from acid residue is 90 percent. The recovered machine oil and the paraffin alone were worth 500,000 yuan, so not only was pollution reduced but benefits were increased.

Everyone feels that, although some successes have been made during the past 2 years in prevention and control of pollution to Bohai and the Yellow Sea, a great amount of work remains to be done in environmental management and control of the sources of pollution in enterprises. Every enterprise now

should build on the existing structure an improved system of rules and regulations for environmental protection and improve management levels of coastal industrial and mining enterprises, promote control through management, combine management and control, effect control at the earliest possible moment, and reduce pollution of the environment and destruction of the ecological balance by the three wastes.

9432

CSO: 5000

PEOPLE'S REPUBLIC OF CHINA

OIL POLLUTION OFF SHANDONG COAST BROUGHT UNDER CONTROL

Beijing GUANGMING RIBAO in Chinese 28 Mar 80 p 2

[Article by Zhu Jiansheng [2612 1696 0022] and Sun Liping [1327 4539 1627]: "Crude Oil Pollution in Shandong Coastal Waters Pollution Substantially Controlled. Decline in Oil Content of Seawater Meets State-Stipulated Water Quality Standards for Fishing Industry"]

[Text] Pollution control work on the crude oil in Shandong's coastal waters has been progressing rapidly, with notable achievements being made. Pollution has been substantially controlled, with the quality of the ocean surface showing marked improvement. According to monitoring done not long ago, the oil content of the water on both the north and south sides of the Shandong promontory has showed a great decline, meeting the quality standards for the fishing industry set by the state.

Shandong Province faces Bohai to the north and looks out on the Yellow Sea to the east. Its coastline is more than 3,000 kilometers long. In recent years, along with the growth of the petroleum industry has come the discharge into the sea of large amounts of oil pollutants, creating a serious pollution problem in neighboring waters. This has impaired the reproduction of marine life, the fishing industry's catch, and the propagation of marine products. It has also directly or indirectly threatened the physical health of the people.

The pollution of the sea along the coast of Shandong caused by crude oil has aroused the concern of pertinent units of the State Council and of Shandong Province. Pollution of Shandong's coastal waters with crude oil is created principally by the Shengli oilfields, the refinery at the main Shengli Chemical Plant, and the Huangdao wharf, which discharge large amounts of oily water into the sea. Actively cooperating with each other and closely coordinating their activities, the appropriate units of the State Council and of Shandong Province organized large amounts of manpower, materials, and financial resources to concentrate on the control of these "three large families." Following 3 years of work, by the end of 1979 crude oil pollution by these "three large families" had been substantially controlled. Not only were the ocean waters cleaned up, but a large amount of crude oil was recovered. In 1978, the Shengli oilfields, the oil refinery of the main

Shengli Chemical Plant, and the Huangdao wharf recovered a total of more than 38,000 tons of crude oil with a value of more than 3 million yuan. Since April 1977, the Huangdao wharf has earned 2.85 million yuan from the processing of polluted water. When the Shengli oilfields begin recycling of polluted water in the future, it will save almost 20 million tons of water annually.

9432

CSO: 5000

PROTECTING FOREST COVER OF 'SAN BEI' REGION URGED

Beijing GUANGMING RIBAO in Chinese 27 Mar 80 p 1

[Article by Du Yali [2629 0068 0448]: "Appeal To Protect Forest Cover of the 'San Bei' Region Made by Delegates Attending 'San Bei' Forest-Shelter Planting Leadership Teams Conference"]

[Text] "Urgent measures are necessary to protect forest cover in the 'San Bei' Region [three provinces of North Central China] in order to consolidate the creation of a forward base of the 'Green Great Wall.'" This was the unanimous call of delegates attending the "San Bei Forest-Shelter Planting Leadership Teams Conference convened recently in Beijing.

Forests in the "San Bei" region of our country are thinly wooded. Existing forest cover is extremely precious, providing an important foundation for the project of building a "San Bei" forest-shelter system. However, this region has for a long time endured unbridled clearing, unchecked pasturing of animals, and reckless timbering, which has still not stopped entirely and which has caused great harm.

The delegates said, the forests of the "San Bei" region, which amount to only slightly less than 100 million mu, are the "base area" for our construction of a "Green Great Wall," with the building of a stretch here and the consolidation of a stretch there. If it is lost, building of a "Green Great Wall" will be very difficult. This is particularly true of the rain-starved desert regions to the west of the Helan Mountains in Ningxia and the Niaoqiao Range in Gansu. If the water conservation forests of the Qilian Mountains and the Tian Shan Mountains cut off the water resources they provide, the consequences will be terrible to imagine. In order to put a stop to tendency to destroy forests, the delegates proposed the following:

First, designate the forests of the Qilian Mountains, the Helan Mountains, the Luo Mountains, the Liupan Mountains, the Ziwu Range, and the Tian Shan Mountains as water-resources conservation forests, and diligently protect them. Make their protection paramount, and both close them to use of any kind and replant them in a plan for actively enlarging the forest area.

Second, strictly protect the natural forest resources of sandy regions prohibiting the destruction of forests and the opening of land to cultivation, and prohibiting the destruction of forests for pasturage. The state farms and pasturelands, the industrial plants and mines, the government organizations, and the military units in the area should immediately stop the cutting and destruction of the existing forest cover. In these regions, building of water conservancy projects must give support to the water resources that the forests need in order to survive, and changes in the ecological balance with the death of large tracts of forests and a retreat of the grasslands must be avoided. Criminals who cause serious destruction to forest resources must be brought to book and severely punished.

Third, all units concerned in the "San Bei" Region must work at the formulation of a plan to protect and manage existing natural forest cover, and make it part of a plan to build a "San Bei" forest-shelter system. Each area should undertake, according to actual conditions prevailing, the revival and establishment of forest protection organizations in key regions, an increase in forest protection personnel, and measures to protect forests against fire.

9432

CSO: 5000

BRIEFS

POLLUTION CONTROL--The Shanghai Metallurgy and Refining Plant has adopted many measures to treat its three wastes and obtained obvious results. In the past year, 20 items, including smoke, dust, acids, and noise have been treated to lessen environmental pollution. Last year the plant established a special department of environmental protection to carry out an overall survey of the condition of the three wastes in the plant. For the purpose of treating the three important items of dusty smoke, acid mist, and slag, a capital investment of more than 300,000 yuan was appropriated. The Fifth Machine Shop of that plant is leading contributor to the creation of pollution; therefore, there is an overall plan to treat the three wastes of that shop. After struggling a whole year, five items, including lead-containing smoke, have been controlled and the sanitation conditions inside and outside that shop have improved. In the process of treatment, comprehensive utilization techniques have been adopted to change waste into valuables. The production process of that plant creates a large quantity of slag, which contains some valuable metals. It is too valuable to be thrown away, but when it is piled up outside, it pollutes that atmosphere and the water. For example, the First Machine Shop has a pile of lead tin ash that has been accumulating for as long as 10 years. Last year the Second Machiner Shop of that plant carried out a comprehensive utilization experiment. The successful result opened the way for disposing of the slag as well as reclaiming the useful metals in the slag. [Text] [Shanghai JIEFANG RIBAO in Chinese 31 Mar 80 p 2] 6168

ENVIRONMENTAL PROTECTION--The Jiaozhou Road street party committee of Pudong District has established close coordination with factories to launch local environmental protection work. The street party committee appointed a special cadre force to carry out the environmental protection work of each street, and organized a unit for joint environmental protection work with the factories to survey the residential districts to gain an understanding of the damages of pollution. The chief of the environmental protection department in the factories is invited to participate in meetings of residents to explain the conditions and the plan for treating the three wastes in the factories. The residents send representatives to investigate the factories, to suggest opinions, or to offer proposals. Mutual coordination between the factories and the residents has made pollution treatment work very effective. For example, the Shanghai Toothpaste Plant Raw Materials Machine

Shop originally had problems of dust, poisonous gases, noise, etc. The conditions are much improved now, and the furnace exhaust has now reached the standard set by the state. The poisonous gases in the Zhonghua Chemical Plant's exhaust have now been basically eliminated, and its wastewater which had a high-density phenol content, has now been treated to conform with state regulations. The Jiaozhou Road street committee also regularly organizes inspections of the factories to praise the advanced and prod the backward. Last year, inspections were being carried out in newly constructed plants and plants in the process of being enlarged which had steam furnaces larger than 1 ton, in order to encourage continuous environmental protection work. Now, among the 47 furnaces with over 1-ton capacity on that street, 33 have been reconstructed so that the exhaust meets state regulations for certification. Of the 137 loudspeakers installed outdoors, 131 have been taken down. [Text] [Shanghai JIEFANG RIBAO in Chinese 31 Mar 80 p 2] 6168

SHIP SEWAGE TREATMENT--For the purpose of meeting the urgent needs of boats and ships, the 704 Institute of the Sixth Ministry of Machinery, with the assistance of Shazhou County Ship Furnace Plant, has completed certification of the WC-120 boat sewage treatment device and the CFZ-40 boat use incinerator. The WC-120 boat sewage treatment device uses the mechanical separation method to eliminate a large quantity of solid waste so that the liquid waste can be used, after treatment, for flushing toilets in a continuous cycle. The CFZ-40 incinerator uses the technique of burning to convert the oil containing mud and solid waste into harmless smoke and bacteria-free ash. [Text] [Shanghai JIEFANG RIABO in Chinese 31 Mar 80 p 2] 6168

WASTE WATER TREATMENT--The No 3 municipal printing plant emphasizes environmental protection work. For 5 years, the 7,000 tons of waste water it discharges per day have, through treatment, always met water quality standards. That plant designates environmental protection and waste water treatment as important items of industrial management. The dye machine shops are required not to pour their residual colored pulp into the drain. After the printing process, the pulp in the disk must be reclaimed so as to reduce water pollution. Moreover, in a year's time the reclaimed pulp is valued at 410,000 yuan. In coordination with environmental protection work, the plant also designates special persons to learn techniques of analyzing water quality, computing data, and mixing standard reagents, etc., so as to train a staff of wastewater treatment personnel. [Text] [Shanghai JIEFANG RIBAO in Chinese 31 Mar 80 p 2] 6168

BIOSPHERE PRESERVES DESIGNATED--Following approval by the State Council and passage by UNESCO personnel and the Executive Bureau of the Council on the Biosphere, three natural preserves of our country--the Changbai Mountains, Wolong, and the Dinghu Mountains--have been designated international biosphere preserves. A responsible officer concerned in the National Committee for Man and the Biosphere said that on 10 January of this year, the director general of UNESCO, Amadou Mahtar M'Bow [of Senegal], formally signed a document on behalf of our country about the three preserves of the Changbai Mountains, Wolong, and the Dinghu Mountains. On 15 March, the

National Committee for Man and the Biosphere issued this document to the three protected area delegates attending the Second Conference of the National Committee for Man and the Biosphere being held in Beijing. The Changbai Mountains, the Wolong located on the eastern slope of the Qionglai Mountains in Sichuan Province, and the Dinghu Mountains located northeast of Zhaoqing City in Guangdong are three of the more than 50 natural preserves of our country. These three preserves have joined the international network of biosphere preserves, and they are China's contribution to world natural preserve endeavors. They will also promote the development of our country's natural preserve endeavors. [Text] [Beijing GUANGMING RIBAO in Chinese 27 Mar 80 p 1] 9432

EXPERIMENTAL SEWAGE TREATMENT PLANT--The newly erected 10,000-ton-per-day intermediate sewage treatment plant in the eastern suburbs of Beijing is about to begin experimental operation. Beijing now has only one large but unsophisticated sewage treatment plant and its daily capacity can handle only 25 percent of the city's sewage. Further, it is a primary operation not equipped to deal with disease-causing bacteria, viruses, parasites, and heavy metal ions. To correct this problem, it will be necessary to construct a large secondary sewage treatment plant, the concerned parties decided to first build this experimental intermediate plant. During the construction of the plant, scientific and design personnel worked on the site, employing a wide range of new techniques and technology in repeated experiments to meet sewage dumping standards. Concurrently, they concluded experiments on sewage treatment with organisms that purify through oxygenation and by "contact" oxygenation. The experiments proved that these methods were 10 to 20 times more effective than traditional means and three times more effective than the recently introduced oxygen aeration method, and were up to world standards. [Beijing BEIJING RIBAO in Chinese 1 Jun 80 p 1]

FARMLAND IN XI'AN SUBURBS POLLUTED--Industrial plants in Xi'an discharge 300,000 tons of polluted water each day. Of these, only 60,000 tons are treated by the natural settling process. The major portion of polluted water enters the Lijiahao reservoir in the northern suburbs without treatment and is used to raise fish or irrigate farmland. The mercury content of the water at its main outlet is 0.4 ppm, 440 times higher than the state standards allow. Polluted water from the Dongjiao Electric Equipment Plant is discharged without treatment, and samples taken from the water show that its mercury content is 1.15 ppm, 1150 times higher than the state standards. The periods during which some farmland is irrigated with the polluted water range from 2 to 18 years, resulting in severe pollution in the soil. The total polluted area is 250,000 mu, mainly located in the eastern and northern suburbs of Xi'an. [Nanjing TURANG (Soil) in Chinese No 5, Oct 79 p 184]

CSO: 5000

THAILAND

PHETCHABUN WATERSHED FOREST DESTROYED

Bangkok DAN HUANG in Thai 10 Apr 80 pp 1, 2

[Article: "Destruction of Forests Discovered North of Dam"]

[Text] Another two national forest reserves, which are watershed areas, are being destroyed. Approximately 10,000 more rai have been destroyed. The province is taking urgent action to protect the forests and has given [the people] permission to engage in farming only until the end of this month. Only trucks are being allowed to enter the forest reserves; tractors are prohibited from entering.

On the evening of 8 April, a reporter stationed in Phetchabun Province reported that 70,000 rai, which is more than 300 square kilometers, of the Huai Ta Po-Huai Yai and Thin-Klong Tib forest reserves, which are in Muang district, Phetchabun Province, had been invaded by more than 2,000 families in order to grow corn. This is the reason that these two national forest reserves have been cleared. These people have felled almost all the trees. Besides this, this has also caused the headwater area to dry up, since these two forest reserves are the headwaters of the Phrom River, and the Phrom River dam in Chaiyaphum Province is located in this area.

Concerning this matter, Mr Chamnan Ruangphaophan, the governor of Phetchabun Province, has ordered that both national forest reserves be closed and that people be prohibited from entering and destroying the forest. At the same time, the Phetchabun Provincial Forestry [Section] has sent officials to the Phetchabun forest area to prevent people from invading and destroying another three areas: Khao Khat in Tabo commune, Tinkhaoban in Napa commune and Tinkhaoban Bothai in Bothai commune. This is the reason why the people who have gone into the forests to grow corn have become angry and gone as a group to discuss things with

Mr Channan Kuangphaophan. The group was led by a representative [to the People's House of Representatives]; it was requested that the province rescind its order and find a way to ease the situation by not establishing check points. The governor of Phetchabun Province did not agree with this. He agreed only to present this matter to the Ministry of Agriculture and Cooperatives for further handling of the matter.

On 8 April, Mr Sucharit Adisonprasoet, the deputy governor of Phetchabun Province, together with Mr Sawai Rotsiri, the deputy regional forestry officer, and Colonel Satoen Pinpak, the superintendent of the Phetchabun provincial police force, went to tell more than 400 people in Tabo village about the bad effects that result from destroying the forest. They told the people that the reason it had not rained during the rainy season was that the forests had been destroyed. Therefore, this is not a matter that can be negotiated. The only thing that can be done is to allow the villagers, that is the people who are already engaged in farming, to continue farming until the end of the harvesting season but this must not extend past the end of this month. They will also be allowed to bring small vans and trucks into the forest reserve area but tractors will be prohibited from entering the forest. It appears that the villagers were satisfied with this.

At the same time, Mr Sucharit Adisonprasoet told the reporter that both forests were virgin forests that contained very valuable timber. Also, these are headwater areas that should be guarded and preserved. Because this is the last forest area in the province that has not been totally destroyed, if people are allowed to use any more of the forest area for farming, it will certainly become a desert.

11943
CSO: 5000

ENVIRONMENTAL PROTECTION POLICY, DEVELOPMENT DESCRIBED

Warsaw GOSPODARSTWO PLANOWA in Polish No 3, Mar 80 pp 131-139

[Article by Bogdan Poplawski: "Environmental Protection and Development in Poland in the 1970's"]

[Text] In the current decade the problems of environmental protection and development are regarded in Poland as one of basic functions of the government (stemming from the primary objective of socialist development) and represent a vital factor in our country's socioeconomic policy which is based on concern for mankind as well as for the preservation of those values that serve to satisfy man's material and cultural needs. This motivation was ratified in the constitution of the Polish People's Republic amended in 1976, whose Article 12 states: "The Polish People's Republic safeguards the protection and rational development of the environment which represents the property of the entire nation." Article 71 states that "the citizens of the Polish People's Republic have the right to benefit from the values of the environment and the obligation to protect it."

Organizational-Legal and Technical-Economic Objectives in the Area of Environmental Protection

The tasks of environmental protection and development outlined in the resolutions of the sixth and seventh congresses of the PZPR concern all areas related to the satisfaction of the needs and the development of conditions for a higher standard of life. The resolutions of the sixth congress stressed in particular that "with a view to our country's comprehensive, rational and dynamic development in the next decade, a concept for a comprehensive program in the area of protection of the human environment must be elaborated within 2 to 3 years. (...) Such proposals will be presented for broad public discussions." The resolution issued at the following seventh congress pointed out very urgently that "more than ever before, we must focus our attention on protection and development of human environment," and furthermore, that "a law on environmental protection must be drafted in the Sejm in cooperation with scientific institutions."

Consistent implementation of the party's decision began with the search for the best possible organizational structure of the environmental protection and development system. The Ministry of Local Economy and Environmental Protection (now the Ministry of Administration, Local Economy and Environmental Protection) was organized in 1972 as the supreme organ of control, planning and coordination of environmental protection and rational development (the ministry is responsible also for local economy, territorial economy, and coordination of regional operations of the organs of the state administration). Other economic ministries expanded the supervision, control and operations concerning special issues of the environment and its protection with particular attention to the development of basic services of environmental protection.

On the level of regional organs of state administration, governors and mayors are responsible for coordinate and operations in the area under discussion. They carry out such functions by the mediation of departments of territorial economy and environmental protection (or water economy and environmental protection) as well as of research and environmental control centers. Such responsibility was ratified by decrees issued by the Council of Ministers in 1976, pertaining to the status of the governor and to the status of the chief of administration. Their respective sections very specifically define the range of the duties and authority of the governors and chiefs as concerns environmental protection.

Statistical reports on environmental protection have been introduced beginning in 1972. Thus, we are now one of the seven countries in the world conducting ecological statistics in general, and one of the five countries that include the results of the studies from that field in their statistical yearbooks.

The preparations of essential bases for environmental protection and development began in agreement with the resolution of the Sixth PZPR Congress. The plan for the socioeconomic and territorial development of our country to the year 1990, prepared by the Planning Commission in 1972-1974, as well as plans for macroregions (prepared in the 1973-1976 period) specified the long-range strategy of our country's territorial development. These plans comprehensively outlined the directions for the development of environmental protection. Among other things, they set the extent for the utilization and rational exploitation of natural resources, the extent of the concentration of our population and of economic activities, as well as the extent of special agricultural, recreational, resort, scenic, etc., advantages.

Along the same lines, the State Council of Experts undertook a study in 1973 aimed at comprehensive evaluation of the actual situation of our environment and at the forecast of the changes, as well as at providing directives for future operations.¹ That document has been discussed in detail by many groups, and on its basis, the Ministry of Administration, Local Economy, and Environmental Protection elaborated--simultaneously with a plan for the territorial development of our country--"The Guidelines for the Program of Environmental Protection in Poland Up to the Year 1990," analyzed by the Political Bureau of the PZPR Central Committee and by the Presidium of the State in 1975.

Those premises—regarded as operational directives subject to precise definition in subsequent long-range and annual plans—envisaged a general arrangement of most of the vital tasks in environmental protection prior to 1990. Moreover, they formulated the following tasks for the future in relation to the main environmental factors:

1. General application of highly efficient technology for dust collection; furnishing more than 1,000 industrial enterprises and other sources of air pollution with dust collectors; achievement of appropriate dispersion of gas pollutants into the air by rational deployment of noxious plants, liquidation of obsolete plants, and by concentration of thermal sources.
2. Construction of sewage treatment plants for 3,000 major and 10,000 minor sources of water pollution, as well as introduction of technological changes in industrial production.
3. Reduction of wastelands, reclamation of about 40,000 hectares of lands devastated by the industry, and of 0.3 million hectares of wastelands resulting from erosion; expansion of economic exploitation of wastes produced by our national economy, as well as expansion of woodlands in our country by up to 30 percent; development of new national parks and sanctuaries on a total of approximately 2.6 million hectares.

The "Program for Water Economy for 1976-1980" drafted in 1976-1977, the "Basic Directions for the Future Development of Water Economy Up to the Year 2000," and the "Program of National Nutrition" were also of considerable importance in determining the directions for environmental protection and development.

The tasks and directions for environmental protection and development were specifically defined in the plans for the development of the provinces drafted in 1975-1977, and in local plans for urban and rural development. A review of those plans in December 1977 indicated that the attempt to include the problems of environmental protection, expressed for the first time in said plans, calls for scientific research, in addition to investments, so as to encompass the widest possible range of natural resources and laws for the purpose of reducing as much as possible the factors of degradation appearing in individual areas of our country. This review also confirmed the necessary elaboration of plans for guinas—basic administrative units in our country. Most of those plans were to be drafted prior to 1980.

Environmental protection and development on the level of provinces were given considerable prominence by the elaboration of individual programs for environmental protection, debated and ratified in the sessions of Provincial National Councils. As of now, all provinces have approved topical programs for environmental protection up to the year 1985 or 1990.

In the 1970's, 30 laws and resolutions, more than 80 orders, directives and administrative guidelines, and numerous decisions by the Presidium of the State dealt with environmental protection. The most meaningful legal acts drafted and issued in the current decade include:

- the 1971 law on the protection of agricultural and wooded lands, and on land reclamation;
- the law on water rights amended in 1974;
- the law on construction rights amended in 1974;
- the law on mining rights amended in 1977;
- the 1971 decision on the Council of Ministers against noise pollution and vibrations
- the 1975 resolution of the Council of Ministers concerning the implementation of tasks of environmental protection in the province of Katowice;
- the 1977 decision of the Presidium of the State on the implementation of resolutions of the Convention on Protection of Marine Environment in the Baltic Sea area.

Pursuant to the resolution of the party congress, the law on environmental protection, drafted in 1976-1978, controls uniformly and comprehensively all the problems under discussion. The Sejm ratified that law in January 1980.

The elaboration and introduction of the organizational structure and of the above-mentioned legal acts facilitated the introduction of tools of central action or economic incentives in the area of environmental protection and development.

Such tools consist of ecological standards, injunctions, bans, and permits, for the purpose of preventing the development of pollutants, or of eliminating them. Here we may mention the ban on the use of toxic agents (DDT), the ban of mercury and cadmium emissions, etc. Furthermore, the standards for admissible air pollutants, quantities and quality of sewage disposal, levels of noise and vibrations, etc., were determined and published.

In addition to the system of fees for water input and sewage output, as well as to allocation of agricultural and wooded lands for nonagricultural purposes, valid since 1975, 35 provinces and 6 provincial cities introduced tree-cutting fees. The new law standardizes those regulations countrywide and expands them, among other things, by fees for the allocation of land for storage yards and for agricultural exploitation of the environment. In accordance with the decree of the Council of Ministers of 1975, the Fund of Water Economy is financed from the revenues derived from the fees for water input and sewage output, which in 1978 amounted to more than 5 billion zloty, and of which more than 50 percent were assigned for the construction of small water-storage facilities, for protection of river banks, sewage treatment, water economy, fish stocking, and scientific research.

The system of cash penalties, in force since 1962, counteracts the pollutants right at their sources. It should be stressed that the penalties levied by inspection services of environmental protection are on the rise, which is a disturbing phenomenon, but it also points to the introduction of increasingly more rigorous methods of supervision. In the 1975-1978 period the penalties for surpassing the acceptable limits of air pollution increased nearly 4 times, and of water pollution almost 3.5 times.

Centers of Environmental Research and Control which supervise the conditions and quality of the environment were organized in 1974 and are continuously being expanded and furnished with the latest equipment and apparatus. At present they employ about 1,800 workers. Their operations are gaining in efficiency, and the range of their supervision is expanding. In 1975-1978 the number of inspections of water and sewage disposal almost doubled to a total of 11,380 inspections in more than 7,000 plants, and in the area of air protection, they again nearly doubled with 4,230 inspections in about 2,800 plants.

Furthermore, rivers with a total length of 21,488 km were tested for purity in 2,270 survey and inspection points (1978 data), as were 100 lakes with an overall area of 28,500 hectares, and 19 water reservoirs. More than 6,000 surveys of emission and fallout of air pollutants were made in 1978.

Of particular importance for the assessment of the actual situation of our environment are inspections of ~~gains~~ conducted in 1976 and 1977, and surveys of agricultural exploitation of lands made in 1978. Results of those inspections demonstrated marked improvements in the land and water development, liquidation of fallow land, higher degree of purity and territorial order. In addition, they also indicated that local roads and water supply in rural areas urgently need to be modernized. Moreover, noted were cases of improper and careless sewage disposal, inadequate retention, and problems of small rural buildings not included to any major extent in records listing the sources of water pollution.

Ample efforts during this decade were devoted to the development of technological programs to counteract environmental degradation. The most significant among them is the introduction of the latest technology of production based on purchased licenses, or the initiation of indigenous scientific solutions, or rationalization proposals. The introduction of dry processes in the production of cement and fiberboards, cellulose bleaching, etc., should be mentioned here. In addition, antipollution equipment and apparatus has begun to be manufactured in our country.

The Association of Ventilation and Air Conditioning Equipment Industries, "Klima-Went," appointed in 1970, and the Association of Technical Facilities of Communal Economy, appointed in 1972, were assigned appropriately challenging tasks for their subordinate enterprises as concerns equipment for environmental protection. In 1975 the Presidium of the State issued resolutions pertaining to the development of manufacture of apparatus and equipment for the Communal Economy in the 1976-1980 period and a long-range plan up to 1990.

It should be stressed that in agreement with the adopted plans, in 1971-1978 the production of the equipment manufactured by the Associated Technical Facilities of Communal Economy has increased three times, and the production of equipment for air-pollution control (KLIMA-WENT) quintupled; however, thus far the needs have not been fully covered. For example, the deficits in the production of dust collectors amount to 30 percent of the production.

In order to improve and accelerate the introduction of sewage-treatment plants, a system of standardization for sewage-treatment units, the so-called UNIKLAR 77, was developed; it helps reduce the operation cycle by 1 year, and in addition, save material and improve the operation. The large-scale production of the BIOBLOK model small units for sewage-treatment plants, launched in 1975, makes possible complete biological treatment of sewage from communities of up to 5,000 residents, from schools, hospitals, and holiday resorts. In 1979-1980, 350 sewage-treatment plants of that particular model will be manufactured.

Furthermore, a program of improvement and modernization of the existing sewage-treatment plants is under way.

One of the essential tools in environmental protection and development at present is the site location policy. In order to introduce that policy in Poland, a system was developed for integrated territorial planning: local, regional, and countrywide. The resolution by the Council of Ministers amended in 1975, which concerns site location of investment projects, serves that purpose, as does the directive of the chairman of the Planning Commission at the Council of Ministers of 1978 concerning an elaboration of documents in the process of site location for investments. According to those regulations, sites for industrial enterprises may be located in those areas where the discharged pollutants cause the least harm, and where the opinion of the minister in charge (administration, forestry, or agriculture) is required for the assessment of noxiousness of certain investments. The resolution further banned site location of investments of arable lands of class I-III, made it obligatory to protect surface and underground water resources, and the atmospheric air, and to protect sanitary conditions and the health of the population, especially in cities and urban centers, forests, and recreational areas, as well as national parks.

During the above-mentioned period, many scientific and research institutes of the Polish Academy of Sciences, institutes of higher education, and ministries became involved in environmental protection and development.

The Institute for Environmental Development, organized in 1974 by the merger of four units, has the task of introducing interdisciplinary studies applied in environmental protection, communal and territorial economy, and in protection of the population. The activities of environmental engineering institutes, water pollution control, and so on, organized within it, are closely related to the problems under discussion.

Among other things, the institutes studied and comprehensively researched methods to improve environmental conditions and to eliminate environmental contradictions in the areas of the Upper Silesia Industrial Region, the Legnica-Glogow Copper Region, the Lublin Coal Basin, and many other areas. The coordinator of basic scientific research at the Polish Academy of Sciences is the "Man and the Environment" Scientific Committee appointed in 1970. The activities of that committee made it possible, among other things, to review in special scientific meetings the problems of research in individual macroregions.

The fact should be noted that schools on all levels prepared and introduced curricula dealing with the problems of environmental protection and development.

In the international arena, Poland's achievements and activities for the benefit of environmental protection and development rank her among the vanguard of countries that have inspired new programs. International programs in recent years demonstrated a comprehensive character and pertained to problems of bilateral, regional and global, significance. We attribute particular importance to the economic and scientific-technical cooperation within the CEMA. We conduct and coordinate many studies in agreement with the Joint Development Program of Cooperation of the CEMA and the Socialist Federal Republic of Yugoslavia Until the Year 1980 in Environmental Protection and Development (...). We are cooperating in programs for improvement of the water supply in the CEMA countries, and coordinating the manufacture of the equipment for water purification systems within the Intervodochistka organization.

In addition, we cooperate with the UN Environment Program, EEC-UN, the UN Food and Agriculture Organization, and with other agencies. Upon their instruction, we prepared numerous reports, conducted scientific surveys, and organized symposia ("Chemical Industry and Environment" in 1973, "The Statistics of Environmental Protection" in 1975, and "The Effect of Pollutants on the Vegetation" in 1979). Polish sciences also help implement international programs of UNESCO surveys.

Bilateral cooperation of the socialist countries, particularly those neighboring with Poland, resulted in considerable achievements and resulted, among other things, in joint solutions of problems concerning the exploitation of the borderline areas Tatra and Krkonose [Riesengebirge] Mountains, and of the areas on the Oder or Bug rivers. Studies conducted for several years with the U.S. Agency for Environmental Protection involved in particular in the exploitation of water supplies, cultivation of strip-mining areas, and the effect of pollutants on human health. We are cooperating with the Scandinavian countries in protecting the Baltic Sea basin.

Moreover, Poland aids many Third World countries by making her specialists available to them, consulting and training their personnel, and resolving specific scientific and planning problems. Joint programs of environmental protection are coordinated by the All-Polish National Unity Front Committee,

which includes the Commission for Affairs of Environmental Protection and Afforestation. The joint environmental protection program owes a great debt to the activities of the LOP [League for the Protection of Wildlife], the PTTK [Polish Tourist and Local Studies Society], Polish Anglers Association, the OIRM [Volunteer Reserve of Citizens Militia] and to the Socialist Youth Union of Poland, the Socialist Union of Polish Students, the Polish Scout Union, and many other organizations. For instance, the LOP supervised in 1978 planting of 4.5 million trees and 3.5 million shrubs, cultivation of more than 8,000 hectares of urban green areas, and installation of feeding trays, removal of snares, care for greenery, and cultivation of the land.

Changes in the Natural Environment in the 1970's

Investments for protection against pollutants and for their retention, and for restoration of the useful values to our natural environment are vitally important for improvement of environmental quality.

Investment tasks in environmental protection were fulfilled with satisfactory results in 1971-1975, but with less satisfactory effects in 1976 through 1979. The phenomenon of underutilized funds allocated for that purpose is disturbing.

Special services of environmental protection in ministries and individual enterprises particularly affected the implementation of the tasks of environmental protection. The process of accelerated organization of such services, launched in the early 1970's, has not been completed to this day. Air-polluting enterprises employed 3,800 persons in such services in 1978, while 25 percent of such enterprises lacked adequate services. The situation appears more favorable in enterprises affecting to a certain extent the conditions of water purity. Approximately 25,000 employees of environmental protection services were employed in enterprises whose water consumption is greater than 40,000 cubic meters, however, 16 percent of such enterprises generally lacked such services.

Atmospheric Air

The rapidly rising growth rate of our industry was the reason why the total production of dust more than doubled in 1970-1978, while the emission of gases increased more than 2.5 times. At the same time, the continuously increasing quantity and quality of the installed purification equipment has cut down the growth rate of pollutants discharged into the atmosphere (total emission of gases and dust in the same period increased only 1.3 times), and helped considerably increase the reduction dust pollution from 84 percent in 1970 to 91.4 percent in 1978, and gas pollution down to 13.5 percent in 1978 (that indicator was higher in 1977, amounting to 16.2 percent). The low level of the reduction of gas pollutants is apparent above all from a lack of scientific technical solutions facilitating absorption or neutralization of gases (especially of sulfur dioxide) on an industrial scale.

The amount of pollutants discharged in the form of dust and gases (except for carbon dioxide) into the atmosphere by industrial enterprises, communal economy, dumps and wastes in Poland was estimated at about 11 million tons in 1975. The share of industrial pollutants was 60-70 percent, of communal economy 10-15 percent, of transportation 12 percent, and of dumps and stockpiles about 6 percent.

Statistical reports include pollutants produced by our industry and heating services, and therefore, the following analysis pertains exclusively to those types of pollutants.

Total emission of dust produced in 1978 by our industry and heating services, which amounted to 2.4 million tons, was reduced by less than 3 percent as compared with 1970, with a significant reduction (11 percent) only in 1970 through 1975. On the other hand, emission of gases has been increasing steadily—in 1970-1978 it rose 1.6 times and amounted to about 4.5 million tons, surpassing the amount projected for 1980.

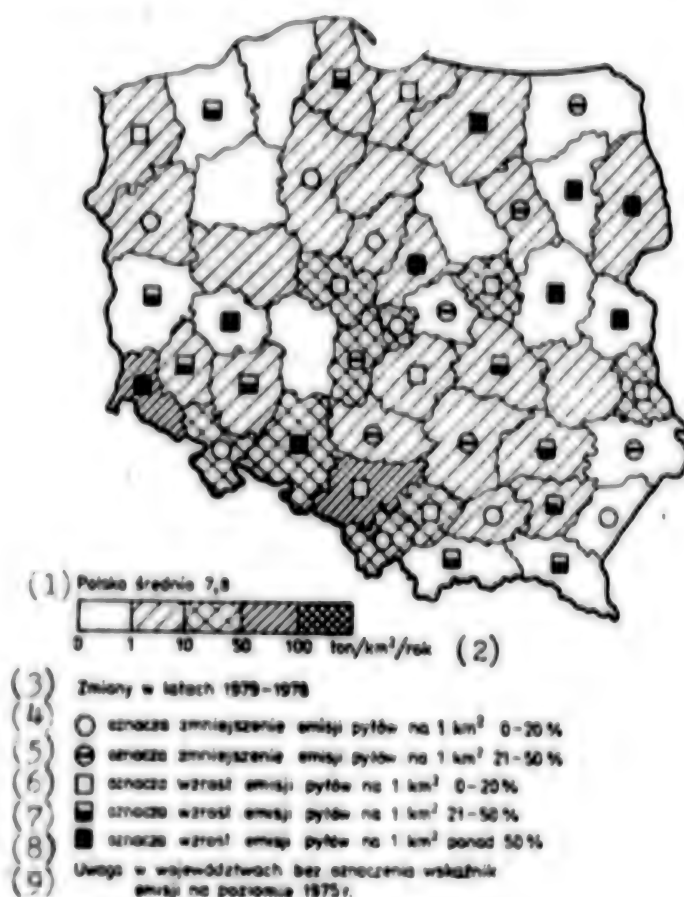
Dust pollutants were discharged by 919 highly noxious industrial enterprises and heating services, while in 1972 there were 884 such enterprises. It is typical that the share of enterprises with annual emissions greater than 10,000 tons remains on the same level as in 1972, namely, 74 percent. Pollutants were emitted in 1978 by almost 900 industrial enterprises and heating services (up about 250 as compared with 1972), and the share of total emissions from enterprises that discharged more than 10,000 tons of pollutants annually is steadily increasing—from 75 percent (in 1975) to 81 percent (in 1978).

Fly ash (63.4 percent in 1978) and dust from cement plants (19.3 percent in 1978) predominated in the generic structure of the discharged dust pollutants. In 1972-1978 the branch or ministry structure of pollutants remained unchanged. The fuel and power engineering (45.8 percent), mineral (21.9 percent), metallurgical (12.2 percent), and chemical (10.9 percent) industries hold the highest share in total dust emissions. Such pollutants are concentrated mainly in the following provinces: Katowice (27.3 percent), Jelenia Gora (8 percent), Krakow City (6.4 percent), Opole (6 percent), and Bielsko Biala (5 percent). As compared with 1975, dust emissions increased considerably in Jelenia Gora Province.

The following gas pollutants were most noxious in 1972, and still are: sulfur dioxide (67.9 percent), carbon monoxide (20 percent), nitric oxide (4 percent), and hydrocarbons (3 percent). As compared with 1972, the share of nitric oxide and hydrocarbons has doubled. As for industrial branches, the highest share of gas pollutants is that of the fuel-power (53.2 percent), metallurgical (22.3 percent), and electroengineering (4.3 percent) industries. Air-polluting gases are now concentrated primarily in the following provinces: Katowice (28.2 percent), Legnica (12 percent), Jelenia Gora (6.8 percent), and Krakow City (6.6 percent).

In comparison with 1972, the indicator of industrial dust pollution has not changed in 1978, its amount being 7.3 tons/square km annually. In the territorial system, dust pollution increased on the territory of the central and northern provinces. Changes in the indicator of dust pollution in 1975-1978 are presented in Fig. 1, from which it appears that dust pollution was reduced in 13 provinces, increased in 27 provinces, and remained unchanged in 7 provinces.

Figure 1. Dust emitted in 1978 by industry and heating services per 1 square km of the area in individual provinces.

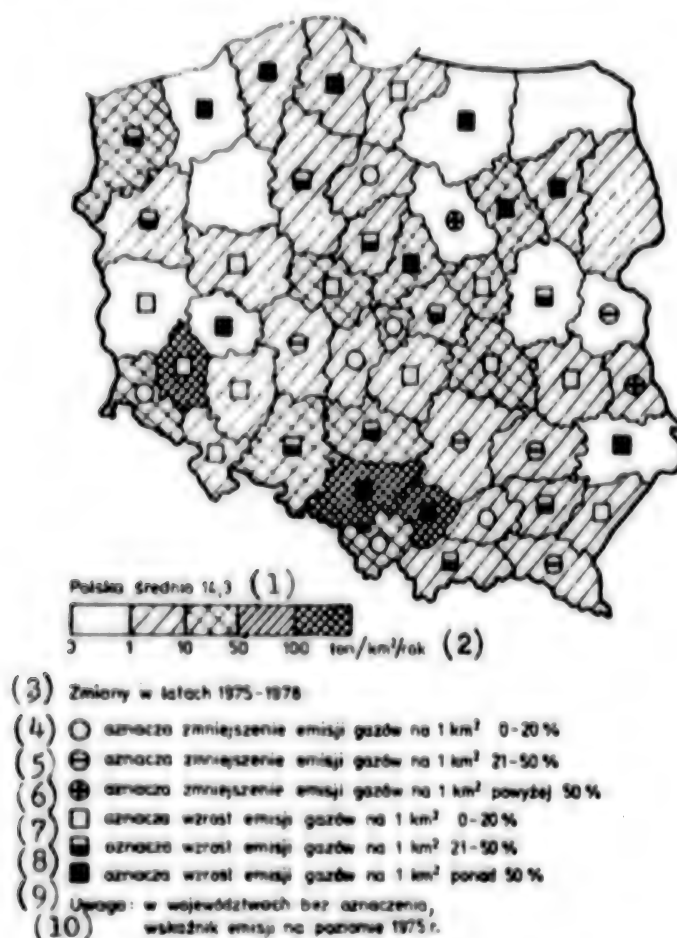


Key:

1. Poland - average 7.8
2. ton/km square/year
3. change in 1979-1978
4. ○ represents dust emissions per 1 km square reduced by 0-20 percent
5. ⊖ represents dust emissions per 1 km square reduced by 21-50 percent
6. □ represents dust emissions per 1 km square increased by 0-20 percent
7. ▤ represents dust emissions per 1 km square increased by 21-50 percent
8. ■ represents dust emissions per 1 km square increased over 50 percent
9. Note: The indicator of emissions in unmarked provinces remained at the level of 1975.

The indicator of industrial gas pollutants per 1 square km of the area of our country increased from 8.7 tons in 1972 to 14.3 tons in 1978. Especially conspicuous is the increase of pollutants on the territory of the central and southwestern provinces, and also in the maritime areas. That indicator was reduced in 1975-1978 in 13 provinces, increased in 33 provinces, and in 3 remained unchanged (see Fig. 2).

Figure 2. Emission of gases by the industry and heating services in conversion per 1 square km of the area of provinces in 1978.



Key:

1. Poland - average 14.3
2. ton/km square/year
3. Changes in 1975-1978:
4. ○ represents gas emission per 1 km square reduced by 0-20 percent
5. ⊖ represents gas emission per 1 km square reduced by 21-50 percent
6. ⊕ represents gas emission per 1 km square reduced over 50 percent
7. □ represents gas emission per 1 km square increased by 0-20 percent
8. ▣ represents gas emission per 1 km square increased by 21-50 percent
9. ■ represents gas emission per 1 km square increased over 50 percent
10. Note: In unmarked provinces the indicator of emissions remains at the 1975 level.

Furthermore, there is the phenomenon of territorial concentration of such pollutants in the area of urban centers encompassing 47.6 percent of the population and covering 18 percent of the area of our country, where 63.4 percent of total dust pollution and 70 percent of total gas pollution were concentrated (1977 data). The heaviest concentration of dust and gas pollutants appears in urban centers of the Upper Silesia Industrial District (24 percent of total pollutants in our country), Legnica-Glogow (7.6 percent), Krakow (6.5 percent), and Opole, Poznan, Szczecin and Bielsko Biala (each about 4 percent).

It must be emphasized that the amount of polluting dust captured in dust collectors in industrial enterprises continues to grow. That amount was more than 10 times higher in 1978, and 8 times higher in 1975, than the amount of the emitted pollutants. Such an achievement was possible because of the continuously increasing number of dust collectors installed; there were more than 9,000 of them in 1972 and 14,000 in 1978. Such equipment has been assessed in terms of its proper use and function. However, the results indicate its technical inferiority. From 20 percent to almost 40 percent of electrofilters, cyclones and other filters in operation have been used continuously since 1972, and their efficiency is low.

Water Management and Water Protection

In terms of its supplies of surface and underground water, Poland ranks among the poorest European countries. At the same time, we note steadily growing needs and consumption of water as a result of our country's socio-economic development. Total consumption of water amounted in 1978 to nearly 14.5 billion cubic meters, increasing by 43 percent against 1970. Our industry, which consumed almost 73 percent of the total consumption of water, is the greatest consumer of water. The rest was used by communal management (16.6 percent) and agriculture (10.5 percent).

Industrial water consumption is affected to a major degree by industrial enterprises consuming more than 40,000 cubic meters of water annually. Their number has grown by 38 percent in 1972-1978, and water consumption by 40 percent, to a total of 10.8 billion cubic meters (including water purchased from other supplies). Those enterprises include a group of 20, mainly power engineering plants, characterized by individual consumption of more than 50 million cubic meters annually, and consuming 75 percent of all the water used in our industry.

In 1978, the provinces of Szczecin (15 percent), Konin (13 percent), Radom (9 percent), and Katowice (8 percent) consumed most water for the needs of national economy, while the province of Konin (14 percent) led in 1975. The sequence and the rates of provinces with the highest water consumption for communal needs remained unchanged: Katowice (23 percent), Warsaw (10 percent), Lodz (6 percent), and Gdansk (4 percent).

In the system of industrial branches most water was consumed for the purposes of production by the fuel and power engineering industry (70 percent), chemical industry (11 percent), metallurgical industry (6 percent), food, wood, and paper industries (each approximately 4 percent)

It should be stressed that the consumption of water by industrial enterprises continues to decline due to the use of closed cycles. In 1978, 41 percent of all the plants using at least 40,000 cubic meters of water annually were furnished with such cycles circulating 17 billion cubic meters of water.

The water supply system for municipal population was markedly improved in 1971-1978 (the capacity of communal intakes was expanded and moreover, new intakes were built). In 1978, households in cities were supplied with 1,160 million cubic meters of water, which is 64 percent more than in 1970. In 1978, 83.3 percent of city residents benefited from water supply systems (in 1970, 80.1 percent). It is envisaged that that indicator will be above 85 percent in 1980. Municipalities with water supply networks constitute 90 percent of all the towns in Poland (in 1970, 80 percent). Such programs raised individual consumption of water in towns from 52.4 cubic meters (1970) to 69.9 cubic meters (1978) per resident. Also, the span between the provinces with the highest (Elblag, 97.6 percent) and the lowest (Bialsko Podlaskie, 34 percent) quota of municipal population using water supply systems was narrowed down from 82 points in 1970 to 63 points in 1978.

Furthermore, rural water supply systems have been improved. In 1970, water supply systems existed in 67 percent of state farms and agricultural production cooperatives, while in 1975 they were operating in 84 percent of the state farms and 75.5 percent of the cooperatives (according to the agricultural register of 1975). It is envisaged that in 1980 almost all such agricultural enterprises will have water supply systems. Water supply systems serving rural households increased considerably. In 1978 water supply systems provided 140.5 million cubic meters of water—almost 370 percent more than in 1970. However, no less significant is the fact that individual agricultural enterprises obtained only 20 percent of their water from water supply systems (in 1970, 9 percent) and 77 percent from wells

The growing requirements for water in our national economy and the scarce supplies call for the availability rate of water supplies to be increased, particularly by building of reservoirs, diversion, and protection of water against pollution.

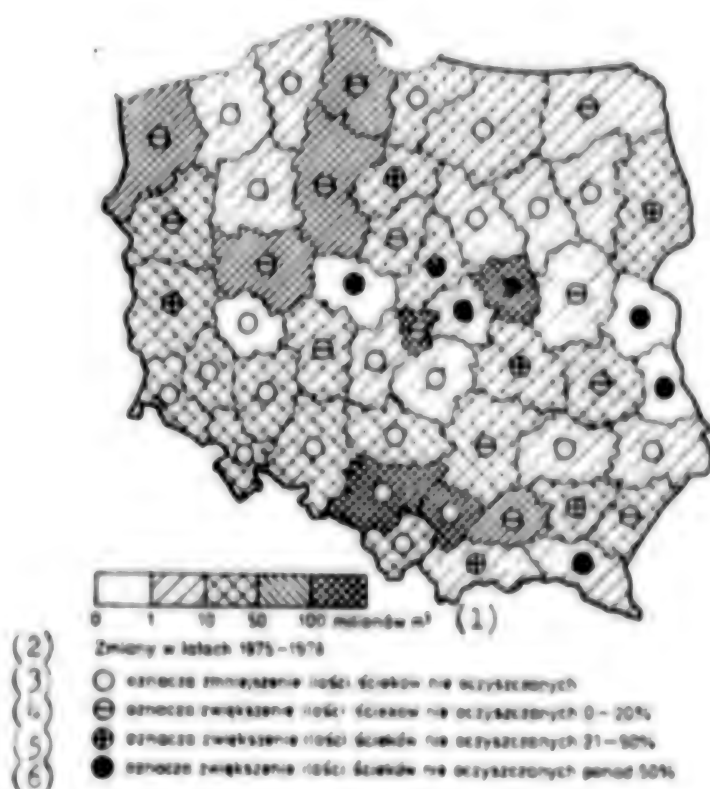
Total capacity of water reservoirs was increased in 1970-1978 by 17.4 by 17.4 percent to more than 2.7 billion cubic meters. The construction of reservoirs now under way, particularly in the southern part of our country, along with diverted waters (for example, Sola-Slask, the Zegrzyn Lake, Warsaw), will make it possible to increase water storage by up to 5.5 percent of the average annual flow.

The assurance of the required purity of the water is the condition which makes it possible to exploit water supplies. It is estimated that the amount of industrial and communal sewage requiring treatment has increased

from 3.7 billion cubic meters in 1970 to 4.6 billion cubic meters in 1978, which means that such sewage increased by 24 percent. Sewage that required treatment amounted to 43.6 percent in 1970 and to 38 percent in 1978. By the same token, the amount of the treated sewage wastes increased from 2 billion cubic meters in 1970 to 2.6 billion cubic meters in 1978, i.e., by 30.5 percent. This was possible due to the construction of 1,109 sewage-treatment plants with 6 million cubic meter flow capacity in 1971-1978. It is important that more sewage is treated biologically. Its share in the total amount of the treated sewage increased from 300 million cubic meters in 1970 to nearly 700 million cubic meters in 1978, when mechanically treated sewage amounted to 62.4 percent, chemically treated sewage to 11 percent, and biologically treated sewage to 26.6 percent.

During the period under discussion, untreated industrial and communal sewage, which is a potential pollutant of surface waters, increased from 1.7 billion cubic meters to almost 2 billion cubic meters (by 17.3 percent). The heaviest concentration of such sewage drained into rivers and reservoirs was observed in 1978 in the following provinces: Warsaw, Krakow City, Katowice, and Lodz (see Figure 3).

Figure 3. Untreated industrial and communal sewage drained into surface waters in 1978, according to individual provinces.



Key:

1. million cubic meters
2. changes in 1975-1978
3. ○ represents reduction in the amount of untreated sewage
4. ⊖ represents amount of untreated sewage increased by 0-20 percent
5. ⊕ represents amount of untreated sewage increased by 21-50 percent
6. ● represents amount of untreated sewage increased over 50 percent

The conscientiously implemented program for construction of sewage treatment plants led in 1975-1978 to simultaneous reduction of the amount of untreated industrial and communal sewage drained into surface waters. During this period, the amount of such sewage decreased in 22 provinces.

It should be emphasized that along with the development of sewerage networks in urban centers, the share of treated sewage drained by that network has increased (from 32 percent in 1970 to 45 percent in 1978). Analogically, the number of urban centers serviced by sewage treatment plants has risen from 29 percent (1970) to 43 percent (1978), which increased the share of urban population serviced by sewerage systems in 1970-1978 by 2.9 points, i.e., to 72.7 percent—unfortunately, with major disproportions among individual provinces.

A negative phenomenon, unfavorably affecting the purity of water and considerably expanding the volume of untreated sewage, outside the saltwater jetties, is improper operation in sewage treatment plants. Only 23 percent of the 1,429 sewage treatment plants registered in 1976 reduced the pollutants to the envisaged level, 26 percent were hydraulically overloaded, and 40 percent were in need of modernization and expansion of their flow capacity.

As for sewage treatment, the situation affects the purity of waters in Poland to a major extent. In terms of purity of water in sections of rivers surveyed during the campaign (12,500 km in 1970, and 13,500 km in 1977), the situation in those years was as follows (see Table 1):

Table 1
(in percent)

Water Standard	Years	
	1970	1977
I	24.8	13.2
II	29.2	29.4
III	17.6	26.8
Waters not corresponding to standards	28.4	30.6

Water pollution on main Polish rivers is above the acceptable standards on approximately 56 percent of the Wisla and approximately 70 percent of the Oder. Only some of the rivers on the western coast and in the northeastern parts of our country, and rivers near their sources are pure.

Furthermore, the purity of water in our lakes has deteriorated. Surveys in 1978 demonstrated that only 30 percent of surface lakes had pure water, and progressing eutrophication was observed.

Progressive deterioration of the quality of surface waters, which is evident on a global scale, despite extensive investment programs, and also the quality of underground waters (as determined by sanitary tests of wells)² must be checked.

Protection of Surface Soil and Waste Disposal

Our country's territorial development leads unavoidably to changes in the exploitation of the land, above all of agricultural areas. The surface of croplands, which amounted to 19.5 million hectares in 1970, was diminished by about 0.43 million hectares prior to 1978 (in the decade from 1960 to 1970 by 0.86 million hectares). Consequently, the rate of transfers of arable lands to other purposes has been slowed down, among other things, as a result of the law on protection of agricultural and wooded lands promulgated in 1971.

In 1972-1978, arable land amounting to 84 percent of the total surface of about 126,000 hectares of areas obtained for nonagricultural or nonforestry purposes was allocated as follows: 27 percent for afforestation, 19 percent for industrial areas, 18 percent for communities, 11 percent for mining excavations, and 6 percent for roads and communication lines (the remaining purposes amounted to 18 percent).

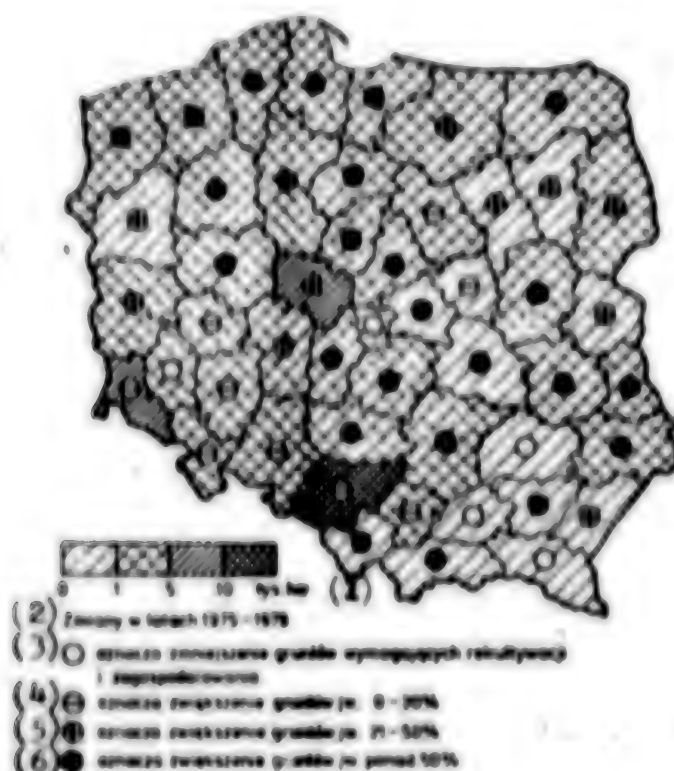
The problem in land management of postindustrial wastelands and other areas in need of reclamation demands attention. Such lands amounted to 103,000 hectares in 1978 (as compared with 1975, up by 12 percent) and were concentrated primarily in the provinces of Katowice (11.3 percent of the total area for reclamation), Konin (5.4 percent), Jelenia Gora (4.9 percent), Opole (4.8 percent), and Koszalin (4.3 percent).

The largest increase of lands in need of reclamation appeared in 1975-1978 in the central and maritime provinces, with declines evident in only 5 provinces (see Figure 4).

In the period from 1973 to 1978 (i.e., since detailed principles for reclamation and management of land came into effect) programs of reclamation involved 24,600 hectares and about 20,600 hectares were cultivated (most of them in the provinces of Katowice and Legnica). About 12,000 hectares were reclaimed and cultivated in 1971-1975. Cultivation of about 27,000 hectares, including reclamation of 4,500 hectares, is envisaged for the current 5-year period.

A crucial problem in the industrial production and exploitation of mineral raw materials concerns the recycling of side products or wastes. Toward the end of 1978 about 820 million tons of industrial wastes were stored in

Figure 4. Lands in need of reclamation and development in 1978, according to provinces (degraded as a result of industrial operations and peat exploitation).



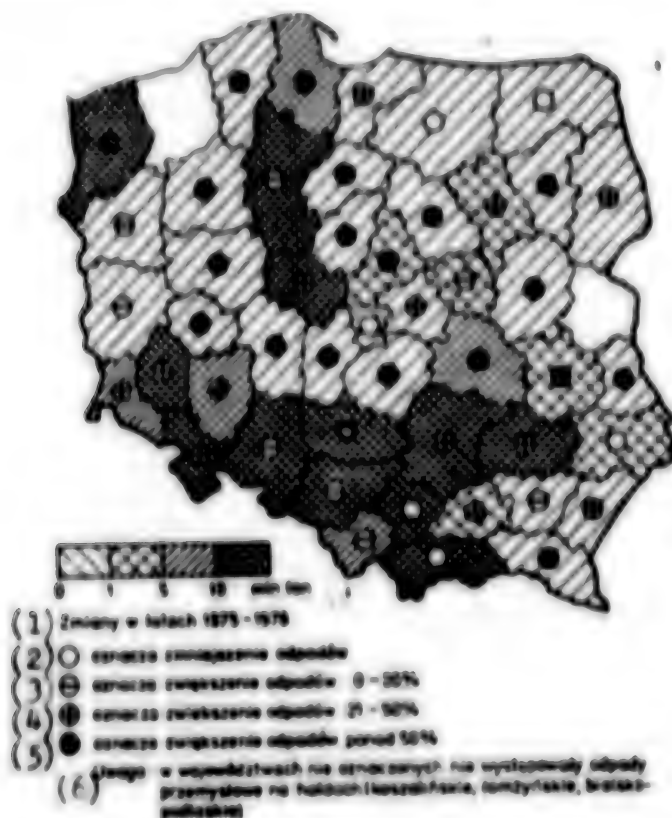
Key:

1. thousand hectares
2. changes in 1975-1978
3. ○ denotes reduction in lands in need of reclamation and development
4. ⊙ denotes 0-20 percent increase in lands, as above
5. ⊙ denotes 21-50 percent increase in lands, as above
6. ● denotes increase over 50 percent in lands, as above

dumps on 3,800 hectares, and in sludge pools on 4,100 hectares (20 percent more than in 1975). Stone debris amounted to 41 percent of that amount, postflotation wastes to 25 percent, slag to 11 percent, ashes and dust to 8 percent, postdistillation wastes to 4 percent. It is typical that 76 percent of all wastes were concentrated on the outskirts of urban centers.

In 1978, more than 560 plants discharging 5,000 or more tons of wastes produced 161 million tons of wastes, 58 percent of which were recycled (51 percent in 1975). Wastes stored in dumps and sludge pools showed the most marked increase in the central and eastern provinces in 1975-1978, while in six provinces wastes were reduced, and in two provinces remained unchanged (see Figure 5).

Figure 5. Industrial wastes stored in plant dumps and sludge pools in 1978, according to provinces.



Key:

1. changes in 1975-1978
2. ○ denotes reduction of wastes
3. ⊕ denotes 0-20 percent increase of wastes
4. ⊕ denotes 21-50 percent increase of wastes
5. ● denotes increase of wastes over 50 percent
6. Note: In unmarked provinces there are no dumps for industrial wastes (Koszalin, Łomża, Białą Podlaską).

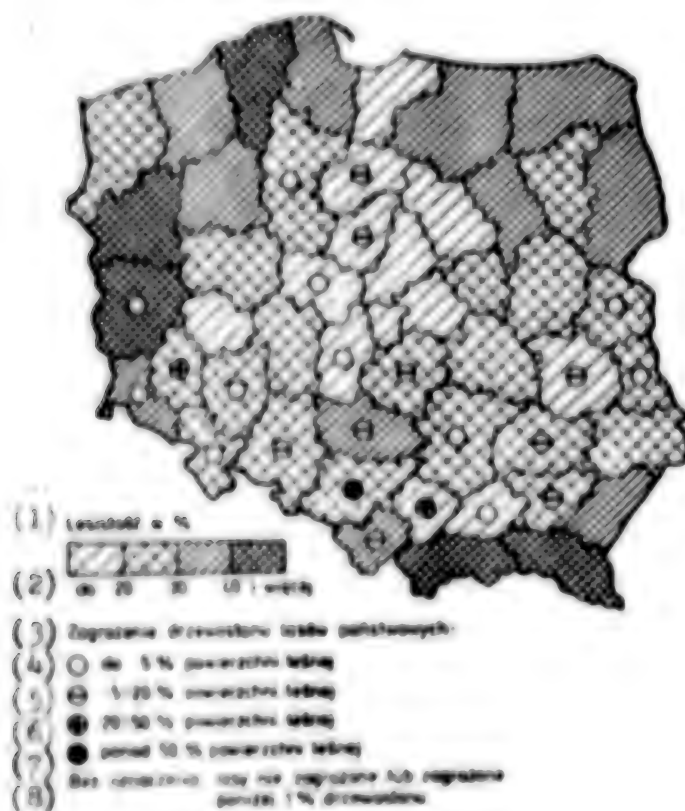
Communal wastes are another source of environmental pollution. In 1978, more than 33.7 million cubic meters of solid impurities (29 percent more than in 1975) and 16.4 million cubic meters of liquid impurities (19 percent more) were removed from residential areas. The surface of streets and squares cleaned was 141.2 million square meters (up by 33 percent as compared with 1975), 76 percent of which was cleaned mechanically. This involved removal and storage in communal dumps of about 33.4 million tons of solid wastes in that year. Most communal wastes were accumulated in the cities of Warsaw, Katowice and Łódź.

Although the rate of recycled communal wastes has doubled in 1975-1978, the surface of dumping grounds increased, of which the surface of unreclaimed dumps by 86 percent.

Management of Forest Resources and Scenic Protection

An indivisible part of our natural environment are forests which, in addition to their productive functions, serve as protection. In 1970-1978, forest areas increased by 156,300 hectares to 8,587,900 hectares, which constitutes a woodland indicator of 27.5 percent (27 percent in 1970). This expansion has been somewhat balanced by the increase noted in the range of the noxious effect of the industry on our forest environment. The area of state forests polluted with dust and industrial gases increased from about 240,000 hectares (2.8 percent) in 1971 to 366,000 hectares (4.3 percent) in 1978. The most endangered forests are in the provinces of Katowice, Krakow City, and Legnica (Figure 6). Furthermore, the forest environment is indirectly endangered by mining operations, such as settlements, flooding, drainage of land, which in 1978 imperiled 26,100 hectares of forest tracts, and only 7,000 hectares in 1975.

Figure 6. Woodlands in the provinces and tree stands endangered by industrial pollution in 1978, according to provinces.



Key:

1. woodlands in percent
2. up to 20--30--40 and over
3. pollution of tree stands in state forests:
4. ○ under 5 percent of forest areas
5. ⊖ 5-20 percent of forest areas
6. ⊕ 20-50 percent of forest areas
7. ● more than 50 percent of forest areas
8. unmarked: forests not endangered, or less than 1 percent of tree stands endangered.

At the same time, areas of protection forests and of forests whose main function is protection of the soil, climate and water, etc., increased to 1.6 million hectares (i.e., from 17.4 percent to 18.6 percent).

The area of national parks was expanded in 1970-1978 from 94,700 hectares to 117,000 hectares, and the area of preserves from 52,600 hectares to 69,300 hectares. Thus, the total protected areas were expanded to 0.6 percent of the area of our country.

The network of preserves is augmented by natural landmarks consisting of rare trees, boulders, rocks, grottoes and caves, whose number increased from 6,500 in 1970 to 10,000 in 1978. In 1975, 34 percent of rural parks surrounding former manor houses, which are a valuable part of our scenery, were legally protected.

The development of living conditions in urban areas should be mentioned here. In 1970-1978, green areas in cities increased from 10,600 to 11,600 square meters per resident. More areas and industrial enterprises polluting the environment were identified and eliminated from residential zones. Central cities were rebuilt so as to decongest the density of buildings (introduction of new urbanistic standards). Communications were modernized by large-scale beltways around towns and rural settlements (noise reduction). The network of recreational areas and vacation resorts was developed and expanded, particularly for the needs of urban centers in Katowice, Lodz and Warsaw.

Summary

The analysis of the achievements to date helps us identify the most crucial problems in environmental protection and development, which call for intensive efforts in the coming years. Those problems may determine the successful fulfillment of our long-range tasks.

The key issues of environmental protection and development in the 1980's should include:

1. Intensification of changes initiated in the current decade in the structure of our agriculture and in the directions of the agrotechnological process. This will require reconstruction of the rural infrastructure as

well as concentration of efforts on proper utilization and development of individual rural areas. Such programs must be based on up-to-date plans for the development of gminas, expanded by the problems related to the operation of rural sewage treatment plants and to territorial pollutants in conjunction with intensification and chemization of our agriculture. The range reserved for the problems of rational exploitation of the land, effective protection of the best soil, and also rationally planned urban construction must be maintained.

2. The implementation of the program for the construction of sewage-treatment plants must be accelerated in order to check the growing pollution of rivers and water reservoirs. Modernization programs must be intensified to provide conditions for proper exploitation of the existing sewage-treatment plants, mechanical equipment and apparatus. Furthermore, efforts must be focused on saving water in production, and also on the introduction of closed cycles, which calls for research-application studies. The program for the development of the Wisla River, now in the first stage of its implementation, will require further coordination of operations on the basis of plans for the development of provinces and urban centers, and also comprehensive scientific research. Especially operations aimed at improvement of sewage disposal in the provinces of Katowice, Krakow, Warsaw, and Lodz must be stepped up. A problem of international significance concerns protection of waters of the Baltic Sea. In conjunction with the endorsed Helsinki Convention, scientific studies (conducted for several years already) must be expanded and the proposed sewage treatment implemented.

3. The program for the installation of anti-air-pollution equipment must continue so as to reduce, above all, gas emissions. For that reason, next to the development of the production base, the research-design potential must be further developed. Modernization and repair programs must be intensified to increase the efficiency of the already installed dust collectors. Further on, efforts must be focused on improvement of air quality in the provinces of Katowice, Krakow, Jelenia Gora and Legnica, as well as in Bieleko Biala, Opole, Ransom, Plock, Konin and Szczecin.

Research concerning transportation of polluting agents to great distances, which has begun, must continue because of the necessity to protect our own territory as well as of the rising significance of that problem on the international scale.

4. Intensification of introductory studies and scientific research concerning current methods of recycling of industrial wastes and of management of wastes stored in dumps. An all-Polish survey of wastes would be helpful. Research-construction studies of small-scale waste-treatment processes need to be further intensified. It is imperative to extend the scale of the scientific research now under way, pertaining to natural development and recycling of communal and certain industrial wastes.

FOOTNOTES

1. "The Comprehensive Program for Environmental Protection and Development in Poland up to 1990" consisted of 309 studies which contained an enormous amount of factual reports made with the participation of 440 scientists and experts. "The Comprehensive Program" included, in addition to strictly scientific materials, also programs prepared by ministries, central agencies, and administrations of provincial national councils. Elaborations of those programs helped the ministries and local units realize the importance of those issues, and led to specific actions.
2. Sanitary tests of public and industrial wells in towns and villages demonstrated in 1978 poor sanitary conditions in 33-46 percent of the wells, and in 72 percent of wells adjacent to rural houses, while analogical data for 1972 amounted to 21-34 percent, and 36 percent, respectively.

9004

CSO: 5000

ENVIRONMENTAL PROTECTION, DANGER OF WISLA RIVER DESCRIBED

Warsaw WIADOMOSCI STATYSTYCZNE in Polish No 5, May 80 pp 4-7

[Article by Marian Grzesiak, Master of Engineering and Jolanta Kida-Kowalczyk, M.A., Department of Agriculture and the Food Economy, Central Office of Statistics: "Environmental Protection and Danger in Poland--the Wisla and Its River Basin (No 5)"]

[Text] Problems of environmental protection and danger to the marine environment and to the air, problems of noxiousness, wastes and of urban centers were treated in earlier articles. In the present article we are discussing the environmental state of the Wisla and its river basin and the dangers to and protection of this environment.

As is well known from the Party initiative formulated in a resolution of the 12th Plenum of the PZPR Central Committee, concerning the preparation of a comprehensive program for developing and utilizing the Wisla and the nation's water resources (16 June 1978), and approved and expanded by the 8th PZPR Congress, our country stands at the threshold of the implementation of a long-term, all-national "Wisla Program," a program considered to be one of the most important tasks for the next two decades.

The implementation of the "Program" requires, in first order, the energetic counteraction of further pollution of the water resources of the Wisla and its river basin and, secondly, the restoration of its quality to serve the needs of all of its users.

The restoration and maintenance of the necessary water quality in the Wisla river basin thus becomes the primary problem in the whole program of the development of the Wisla river basin. In solving the problem of ensuring that the required amount of water flows through its feeders into water reservoirs, if the simultaneous attainment of its suitable quality is not ensured, the water quality may be further endangered as a result of the diminished level of water exchange and the reduction in the speed of the natural process of the self-purification of the water in newly created storage reservoirs.

Thus, on the threshold of such an enormous undertaking, it is perhaps worthwhile to characterize the present quantitative/qualitative state of the water resources of the Wisla and its river basin; the directions and magnitude of their utilization; the consequences of economic activity and its effect upon water purity; and the existing potential for protection and the scope of our needs in this field.

The basis for the execution of this characterization is primarily statistical data derived from studies and analyses of the Central Office of Statistics (GUS) in the field of environmental protection and the marine economy, which were the direct result of the espousal of a resolution from the 12th Plenum of the PZPR Central Committee indicating the need for efforts in the direction of the analysis and implementation of a "Wisla Program."² The more detailed illumination of the problems of the utilization of water resources by industry in this article issues from the dominant role played by industrial activity with regard to its consequences to the environment of the Wisla and its river basin.

Water Resources of the Wisla and Its River Basin

The Wisla and its river basin occupy a key position in the whole structure of the national marine economy. It is the largest and most water-abundant river in Poland and within the catchment basin of the Baltic Sea (1,047 kilometers long) and possesses a river basin within Poland's borders that has a surface area of 168.7 thousand square kilometers, which represents 54 percent of the surface area of the country. This area is inhabited by nearly 26 million people and has a concentration of two-thirds of the country's industrial potential and 60 percent of its farm production.

Industry, the communal economy and agriculture obtain water from the Wisla and the network of its tributaries, representing 55 percent of the marine resources of the country.

The water resources of the Wisla river basin, like those of the country as a whole, are meager by comparison to our constantly growing needs. These may be generally characterized in terms of the volume of water precipitation and outflows. The area of the Wisla river basin within Poland's borders, within a normal year, receives an average precipitation of approximately 106 billion cubic meters (628 millimeters), of which 28 billion cubic meters flows into the sea, and 78 billion cubic meters represents a so-called "loss" in evaporation and transpiration. Table 1 shows the water resources of the Wisla river basin against the background of the country's resources in general for particular periods of the so-called hydrological year.

Table 1. Balance of Marine Resources by Tributaries^a

Itemization	Average for the period 1951-1970 in billion cubic meters				
	precipitation		outflows		losses
	year (Nov-Oct)	year (Nov-Oct)	winter (Nov-Apr)	summer (May-Oct)	year (Nov-Oct)
Total	190.7	51.3	29.4	21.9	139.4
Wisla river basin	105.9	28.1	15.9	12.2	77.8
Odra river basin	62.0	14.1	8.1	6.0	47.9
Direct catchment basin of the Baltic (within Poland's borders) ^b	11.6	4.9	2.8	2.1	6.7
Other areas ^c	11.2	4.2	2.6	1.6	7.0

a) Within Poland's borders

b) Together with the area of the Dead Wisla

c) Included here are the river basin of the Bay of Szczecin and the Wisla Bay (within Poland's borders) and the river basins of rivers that flow out of Poland

Source: Data of the Institute of Meteorology and the Marine Economy.

During the period of large spring overflows the Wisla drains great amounts of water into the sea, which is not only of no usefulness to the economy, but also causes significant losses and damage as a consequence of flooding. Between the outflows, there sometimes occur low water conditions, during which serious difficulties and limitations arise for the consumption of water for the needs of the populace and the national economy.

The fact must also be taken into consideration that only a portion of the water of the Wisla and its river basin may be utilized, since a certain amount must always remain within the river as the so-called undisturbed flow.³

The water potential for economic usage is characterized as the so-called available resources⁴ which for the whole Wisla river basin in an average year totals approximately 15 billion cubic meters (in a dry year they are much lower). In reality we have available more water than this, since a certain amount of water along the course of the Wisla and its river basin from source to sea may be used repeatedly. The number of times this water may be used depends both on the density of the location of users and on the water purity in the Wisla and its river basin, and this as we shall point out, is becoming worse and worse.

Water abundance in particular parts of the Wisla river basin may also be characterized by run-offs from a unit of surface area expressed in liters per second from 1 square kilometer of the river basin. This index is not only a function of precipitation, but also of the geographical characteristics of the river basin, and even of the economic usage of the water. And so, e.g., the value of a unit run-off for the average water flow in the Wisla itself at the mouth of the Dunajec River amounts to 8.4 liters per second per square kilometer, at the point of entrance into the sea--4.5 liters per second per square kilometer; in the Dunajec River at its entrance to the sea--4.5 liters per second per square kilometer; in the Drweca River at its entrance to the sea--5.8 liters per second per square kilometer. In general, the mountain tributaries of the Wisla are more water-abundant than lowland rivers. For example, the river basin of the highland Wisla encompasses an area equal to 12.5 percent of the river basin of the whole river and provides outflows amounting to 42 percent of the entire outflow of the Wisla.

With regard to the distinct hydrological character and varying water depths of particular sections of the Wisla, it is divided in the following manner⁵:

--the highland Wisla, from the mouth of the Przemsza to the mouth of the San (280 kilometers),

--the midland Wisla, from the mouth of the San to the mouth of the Narew (270 kilometers),

--the lowland Wisla, from the mouth of the Narew to the sea (391 kilometers).

The above sections of the Wisla are characterized by a wide variation of flows. This is represented in table 2.

Section of the river	Section (water-level indicator profile)	Characteristic flows for the period 1951-1970 in cubic meters per second			Ratio of minimal to maximal flows
		lowest of the minimal	average	highest of the maximal	
Highland Wisla	Dwory	11.6	60.5	1490	1: 128
	Sandomierz	57.0	288	5690	1: 100
Midland Wisla	Zawichost	84.0	429	6160	1: 73
	Warsaw	108	570	5650	1: 52
Lowland Wisla	Plock	162	898	6900	1: 43
	Tczew	253	1010	7840	1: 31

Source: formulated according to data of the Institute of Meteorology and the Marine Economy.

One effective method for reducing periodic fluctuations in outflow is the storage of water in reservoirs. At present in the whole country 2.9 billion cubic meters of water are stored in reservoirs, with 1.9 cubic meters being stored in the Wisla river basin. Stored water represents scarcely 5 percent of the yearly outflow of our rivers. An analogical indicator shows 15 percent in Bulgaria, 14 percent in the USSR, and 12 percent in the CSSR. Such a low level of water storage in Poland limits the possibility of its rational usage to a great degree.

In order to keep pace with the growing demand for water, plans are being made to construct approximately 30 large and medium-sized multi-purpose reservoirs within the next two decades, with 20 of these reservoirs planned for the Wisla river basin. This will enable the storage of water in the amount of approximately 18-20 percent of the annual outflow.

The capacity of conservation storage in reservoirs will allow for the storage of water supplies and for its availability in periods of insufficient precipitation, for guiding the flows in the Wisla and its tributaries, for executing the transfer of water to areas in short supply and for significantly reducing the dangers of flooding.

The Utilization of the Water Resources of the Wisla and Its River Basin

Industrial plants, cities and agriculture direct their demand for water to the Wisla and its tributaries. It is estimated that at present approximately 52 percent of the water needs of the country are filled from the Wisla river basin, and 35 percent are filled directly from the river itself. Table 3 provides information about the share of the Wisla river basin in the nation's water consumption to serve the needs of the populace and of the national economy.

The total consumption in 1978 in the Wisla river basin to serve the needs of the populace and the national economy was approximately 7.5 billion cubic meters of water. Of this, 75 percent of the water satisfied the needs of industry, 15 percent—the needs of the communal economy. The remaining 10 percent was used in the irrigation of farmlands and forestlands and to fill fish ponds (consumption by the village population for household needs and for raising farm animals is not included in the data below).

Among industrial plants located in the Wisla river basin, those drawing more than 40,000 cubic meters of water a year or draining off the same amount of sewage (approximately 100 cubic meters daily) exert the prime influence on the water-sewage economy. In 1978 there were 1,969 such plants in the Wisla river basin, consuming altogether 5.6 billion cubic meters of water, or 52 percent of the national consumption of water for industrial purposes. Of this amount, 5.2 billion cubic meters were used by 243 plants, of which each consumed more than 1 million cubic meters of water yearly, and within this number, 12 plants consumed 4.1 billion cubic meters of water. The latter were primarily power plants with a yearly demand for water exceeding 50 million cubic meters.

Table 3. Water Consumption to Serve the Needs of the National Economy in 1978.

Itemization	In general		Including the Wisla river basin
	in millions of cubic meters		by percentage in general
Water consumption in general for the purposes of:	14,443	7,482	51.8
Industry	10,875	5,573	51.7
Agriculture and forestry ^a	1,523	797	52.3
The communal economy	2,135	1,112	52.1

a) To irrigate lands and fill fish ponds

Source: data of the Central Office of Statistics.

Industry, a major user of waters in the Wisla river basin, at the same time consumes surface waters above all. In 1978, the share of surface waters within the general consumption for industrial purposes in the Wisla river basin amounted to approximately 90 percent. The remaining 10 percent of industrial water needs was served by underground and mine waters.

Table 4. Water Consumption from the Specific Intakes of Industry according to Sources in 1978.

Itemization	Water consumption (for industrial purposes)			
	in general	surface waters	underground waters	mine waters (used in produc- tion)
In millions of cubic meters				
Poland	10,546	9,557	657	332
including the Wisla river basin	5,499	4,899	374	226
In percentages				
Poland	100.00	90.6	6.2	3.2
including the Wisla river basin	100.0	89.1	6.8	4.1

Source: data of the Central Office of Statistics.

The water needs of industry in the Wisla river basin are characterized by a great deal of territorial differentiation. The greatest water consumption in 1978 was noted in the catchment basin of the midland Wisla--from the mouth of the San up to the mouth of the Narew inclusive. In this region, 749 industrial plants drew water, each of them consuming at least 40,000 cubic meters of water annually; some, like the "Kozienice" power plant, the "Siekierki" and "Zeran" thermo-electric power station and the Nitrogen plants in Pulawy had a per-unit consumption of water in 1978 that was greater than 100 million cubic meters. These plants (the 749) as a whole drew approximately 3 billion cubic meters of water (54 percent of the needs in the whole river basin) from the midland catchment basin of the Wisla.

The power-conversion plants located in the highland Wisla catchment basin, from sources up to and including the San (718) manifested a slightly lesser demand for water in 1978. Enormous industrial-economic potential for the country is concentrated here in a relatively small area, and the demand for water in this region (approximately 37 percent of the needs in the whole river basin) often exceeds available resources. Local water shortages for industry are often covered in part by the transfer of water from areas which are better supplied or have repeated consumption (through the application of closed cycles).

The lowland Wisla catchment basin from the mouth of the Narew to the sea is an area with a lower level of industrialization. Water consumption in this area for 1978 amounted to approximately 0.5 billion cubic meters (9 percent of the needs in the whole river basin), affording the total satisfaction of the water needs of 502 industrial plants which used more than 40,000 cubic meters of water a year.

Information concerning the amount and sources of water consumption by industry in particular parts of the Wisla river basin in 1978 is presented in table 5.

Table 5. Water Consumption for Industrial Purposes in the Wisla River Basin in 1978.

The Wisla River Basin	Plants using water	Water consumption (from the specific intakes) of water in millions of cubic meters			
		in general	surface	underground	mine
In general	1969	5499.2	4899.0	374.2	226.0
Highland Wisla	718	2029.5	1721.5	85.5	222.5
Midland Wisla	749	2988.7	2809.1	178.9	0.7
Lowland Wisla	502	481.0	368.4	109.8	2.8

Source: data from the Central Office of Statistics.

The water needs of the communal economy in 1978 amounted to approximately 1.1 billion cubic meters, representing nearly 15 percent of the total water consumption in the Wisla river basin. From among 370 cities located along the area of the river basin, 328 of them had a water-supply system, with 83 percent of the inhabitants using this system and a consumption per inhabitant which amounted to approximately 307 liters. It is assumed that by the year 2000 approximately 97 percent of the urban population should be assured a supply of water from a water-supply system, and that the water consumption per inhabitant in the course of a day will be 540 liters.

The water needs of agriculture encompass water consumption for the irrigation of grasslands, for the sprinkler irrigation of arable lands, for the filling and supplying of fish ponds and for the supplying of villages with water. Given the climate and soil conditions of our country, water is of prime significance to the intensification of agricultural production. To illustrate how much water is consumed in vegetative production we may mention that to attain 1 kilogram of yield the following amount of water is needed: for potatoes--200 liters, for rye--300 liters, and for hay--800 liters.

Among the approximately 206,000 hectares of croplands irrigated in the Wisla river basin, arable lands represented less than 6,000 hectares, and grasslands, 200,000 hectares. The amount of water drawn to irrigate this area amounted to approximately 255 million cubic meters (approximately 40 percent of the national total). In 1978 the dominant method of irrigation was the capillary method. This was the method used for 97 percent of the surface area irrigated in the Wisla river basin, while sprinkler irrigation was used for scarcely 2 percent of the area. In order to illustrate the level of needs and tasks in this field, we may mention that the advisability of introducing irrigation systems in the Wisla river basin for an area of approximately 1.5 million hectares of croplands, including the use of sprinkling systems for approximately 0.5 million hectares, is being investigated.⁶

The State of Water Purity of the Wisla and Its River Basin

The constant and rapid growth of the demand for water (e.g., by 43 percent from 1970-1978), primarily as a result of the growing level of urbanization, industrialization and the intensification of agricultural production is causing the drainage of greater and greater amounts of sewage.

In the Wisla river basin, the combined amount of sewage drained into surface waters in 1978 was 6.3 billion cubic meters, which represented approximately 52 percent of their total amount. Of this amount, 2.8 billion cubic meters required treatment. Of the 1.4 billion cubic meters treated, 64 percent underwent treatment by mechanical methods, 13 percent by chemical methods and 23 percent by biological methods. Information is given in table 6 concerning the share of communal and industrial sewage treated by various methods and concerning untreated sewage in general.

Of the 1.1 billion cubic meters of sewage drained into the urban sewerage system, only 42 percent was treated, with scarcely 20 percent of this amount being treated biologically. A decisive effect on the state of purity of waters of the Wisla and its river basin has been exerted by industrial wastes, however, of which 5.2 billion cubic meters drained into surface waters, 3.5 billion cubic meters of these being cooling waters. Although these waters are not formally recognized as sewage requiring treatment, when drained into rivers they cause essential, generally unfavorable changes in the natural environment (thermal pollution).

Among the 1.7 billion cubic meters of industrial sewage needing treatment, only 1.0 billion cubic meters (58 percent) underwent such processes. Of this up to 70 percent of such sewage was treated mechanically, and only 11 percent was treated biologically, i.e., at the level corresponding to the regulations of environmental protection.

The greatest charge of pollutants was introduced by industry into the surface waters of the highland Wisla catchment basin. In 1978, for 705 million cubic meters of untreated sewage drained by industrial plants located in the Wisla river basin, up to 393 million cubic meters (56 percent) was sewage in the highland Wisla catchment basin up to the mouth of the San river. Moreover, in this region the problem of protecting surface waters against excessive salination by waters issuing from hard coal mines has not been solved. Surface waters in mine areas have such high salination indexes that they are not suitable for economic use without the application of costly methods of desalination.

The state of water purity of the Wisla and its river basin, subject to the quantity and quality of sewage drained, as represented above, is highly unsatisfactory. For that whole section of the Wisla which is checked by quality tests (from Przemyśl to its mouth), the waters conducted through this region were generally not of the first or second category of purity, i.e., waters most valuable for their suitability for supplying people (class I), for raising fish and farm animals. The remaining 56 percent are excessively polluted waters which lack biological life and do not comply with obligatory standards. Non-classified waters are in principle unsuitable for economic purposes, and in the event of the necessity of their utilization require costly methods of treatment. The state and changes in the state of water purity of Wisla waters in the last decade is represented in table 7.

Table 6. Industrial and Communal Sewage Drained into Surface Waters in 1978

Itemization	Sewage drained in millions of cubic meters					
	requiring treatment			untreated		
	treated			untreated		
	in General	cooling waters	together	together	mech- anical	biolog- ical
	Poland					
In general drained:	12116	7510	4606	2612	1630	696
Directly by industry ^a	9991	7510	2481	1659	1173	200
By an urban sewerage system ^b	2125	--	2125	953	457	496
	Including the Wola and its river basin					
In general drained:	6283	3492	2791	1443	926	331
Directly by industry ^a	5182	3492	1690	985	690	109
By an urban sewerage system ^b	1101	--	1101	458	236	222

a) Together with cooling waters and polluted mine waters.

b) From households, industrial plants and other entities (construction enterprises, transport enterprises, offices and the like)--without water from precipitation and infiltration.

Source: Data from the Central Office of Statistics.

Table 7. State of Purity of the Wisla

Itemization	1967	1970	1973	1976	1977
In kilometers					
The length of sections studied	980	980	980	980	980
Classes of water purity: I	--	--	--	--	--
II	174	132	336	--	--
III	476	377	373	177	432
Waters not complying with standards	330	471	271	803	548
In percentages					
The length of section studied	100.0	100.0	100.0	100.0	100.0
Classes of water purity: I	--	--	--	--	--
II	17.7	13.5	34.3	--	--
III	48.6	38.4	38.0	18.1	44.2
Waters not complying with standards	33.7	48.1	27.7	81.9	55.8

Source: Data from the Institute of Environmental Development.

The above data show that in the course of the past ten years a basic worsening in the quality of Wisla waters, expressed partly by the total disappearance of class II waters, has occurred.

At present a significant portion of the waters of the Wisla and its river basin does not meet with the accepted standards. This means that they cannot be used either for communal or for industrial purposes. Their utilization in agriculture is also limited. Waters from the highest class are now found only in highland sections of Carpathian tributaries of the Wisla. The state of water purity of rivers checked by testing in the Wisla river basin is presented in table 8.

Table 8. The State of Purity of Rivers in the Wisla River Basin
Checked by Testing

Itemization	Sugar-beet processing period		Sugar-beet non-processing period	
	1967	1977 ^a	1967	1977 ^a
In kilometers				
The length of sections studied	6272	7454	6272	7454
Classes of water purity: I	2213	766	2322	766
II	1369	2462	1600	2476
III	990	2270	1099	2361
Waters not complying with standards	1700	1956	1251	1851
In percentages				
The length of sections studied	100.0	100.0	100.0	100.0
Classes of water purity: I	35.3	10.3	37.0	10.3
II	21.8	33.0	25.5	33.2
III	15.8	30.4	17.5	31.7
Waters not complying with standards	27.1	26.3	20.0	24.8

a) Non-final data.

Source: Data from the Institute of Environmental Development.

The quality of the waters of the Wisla and its tributaries is subject in part to the potential and state of facilities protecting waters against pollution. The facilities in operation today do not ensure the proper protection of waters, and the gradual quantitative growth of industrial and communal pollutants which are more and more often drained into clean rivers causes the systematic decline of class I and II waters.

A total of 691 treatment plants⁷ with a per-unit flow capacity greater than 100 cubic meters daily is in operation directly in the Wisla river basin. The combined flow capacity of these treatment plants is 3.4 million cubic meters daily, versus the presently desirable capacity of 7.6 million cubic meters daily.

An evaluation of the technical state and operational efficiency of sewage treatment plants which has been completed raises many doubts. Less than 10 percent of the total amount of sewage produced in the Wisla river basin is treated in a manner complying with projected assumptions for treatment plants.

The efficiency of treatment plants, with regard to hydraulic overload, improper operation and mechanical equipment break-down is very low. It is estimated that only 31 percent of all treatment plants in the Wisla river basin operate according to regulations established by administrative officials.

At the same time, for 370 cities located in the Wisla river basin in 1978, 205 did not possess sewage treatment plants. On the other hand, of the 165 cities served by treatment plants, 65 were cities in which sewage was treated solely by mechanical methods.

With reference to industrial sources of pollution of the Wisla and its tributaries the situation is still less favorable. Of the 1,969 industrial plants which drain at least 40,000 cubic meters of sewage yearly, only 35 percent of these had a sewage treatment plant (primarily a mechanical one), while 1,052 plants drained their untreated sewage into the urban sewerage system or into the ground.

The characterization presented here shows that much remains to be done in the sphere of preventing the excessive pollution of waters in the Wisla river basin. Most operational treatment plants require technological streamlining, modernization or partial reconstruction. Moreover, there exists the need for the construction of many new treatment plants. The "Program for Managing the Wisla and Its River Basin" takes this into consideration, proposing the construction of 180-190 large sewage treatment plants, most of them combined and group plants. Besides these large treatment plants, smaller, specialized treatment plants will also be built primarily for industrial plants, hospitals, hotels, recreational centers, and the like. Their operation will have special significance for the state of purity of waters in small rivers. The modernization of existing treatment plants and the construction of new ones should lead to a halt in the growth of pollutants, and finally to the gradual improvement of the purity of the waters of the Wisla and its river basin.

FOOTNOTES

1. See "Environmental Protection and Danger in Poland," WIADOMOSCI STATYSTYCZNE, No 11, 12, 1979 and No 2, 3, 1980.
2. The first results of these efforts were published in a publication of the Central Office of Statistics from the series INFORMACJE. MATERIALY STATYSTYCZNE titled "Water Resources and Water Sewage Disposal. The Wisla and Its River Basin," Warsaw, 1979.
3. Undisturbed flow is that amount of water which must remain in flow in order to maintain its biological life and the self-purification capability of the waters.

4. Available resources are those resources which, in a given period, may be drawn from the sources of water consumption to serve economic needs. Available resources of water in flow are contingent upon so-called gross resources and upon the undisturbed flow of the water.
5. Aleksander Tuszko, "Wisla przyszlosci" [The Wisla of the Future], Ksiązka i Wiedza, Warsaw, 1977, p 90.
6. See Czesław Somorowski, "The Marine Economy in Agriculture against the Background of a Comprehensive 'Wisla Program'," GOSPODARKA WODNA, No 10-11, 1979.
7. Henryk Manczak, "Protecting Wisla Waters in the Light of the Comprehensive Management of Its River Basin," GOSPODARKA WODNA, No 10-11, 1979.

36

5000

ENVIRONMENTAL PROBLEMS IN HAVANA PROVINCE EXAMINED

Havana REVISTA CUBANA DE HIGIENE Y EPIDEMIOLOGIA in Spanish Sep-Dec 79
pp 301-309

[Article by Dr Uvelino Moreno Jimenez, provincial deputy director of hygiene and epidemiology, Havana Province, Dr Vero Gallardo Espinosa, director of the San Jose Provincial Center of Hygiene and Epidemiology, and T. S. Raul Leon Benitez, head of the provincial section of environmental science, Havana Province]

[Text] Summary

Conceptual aspects of environmental pollution and its definition are suggested in the introduction. Man's influence on his environment — mainly the physical factors of the environment: water and the ground — and the extent of environmental pollution in Havana Province are analyzed. Current problems resulting from sources of pollution, whether the dumping of waste materials is into the aquiferous bed, the sea or the ground, are described. Finally, possible consequences and measures for solving the problem are outlined.

Introduction

When, at the beginning of the history of man, he ceased being a nomad and began to create human settlements, there immediately arose a need to control the environment, since life in a community is impossible if a whole series of protective measures are not taken. Without them, the subtle self-cleansing mechanisms are broken and the environment becomes aggressive, providing a breeding ground for disease and even the death of the community that violated the mechanisms.

Health and disease are variations of the subtle and continuous process of the adaptation of every human being to an environment in a constant state of change as a result of different types of stimuli.

The development of society is intimately linked to modern technological advances and therefore, to the repercussions which the use of these techniques in industrial, agricultural and other types of institutions can have

on man and his environment. These waste products are veritable contaminants if not disposed of and treated properly.

Human ecology has shown that health and disease are not therefore merely opposing states, but rather, different degrees of adaptation of the organism to the environment in which it lives, since the very factors aiding such adaptation can act in an opposite sense.

There are many factors acting on human ecology. Among those which have a negative effect on health and contribute to disease is environmental pollution.

We might define environmental pollution as the presence in the environment of substances in quantities and degrees of concentration capable of interfering with the well-being and health of man, animals and plants.

One of the essential objectives of the socialist society is to ensure the health of man by creating environmental conditions permitting maximum enjoyment of a healthy life. That is why our health administrators, our hygienists, in short, our health team, must be aware of all the possible hotbeds of pollution in order to take action and dictate the measures needed to minimize their harmful effects on human ecology.

The impetuous advance of our revolution and the maximum application of technology to the industrial and agricultural areas in the province entail the risk of environmental pollution, a risk that is obvious in certain centers, which have inherited a capitalist past, and in others that have emerged since the triumph of the revolution. This forces us to reflect in order to initiate the application of measures eliminating sources of pollution that already exist and prevent the development of new sources. That is the purpose of this work.

Influence of Man on His Environment

Based on the concept that the environment is the common surroundings in which human societies develop, its preservation and enrichment constitute an ever more universal issue and a matter of concern in the field of public health. This environment is governed by an enormous series of laws of biology and ecological balance, as a result of which every species finds its precise place within the system and through its living acts, contribute in turn to the constant evolution of the milieu, the soil, water and air. This evolution is accompanied by technical development and permits better use of the environment, seen as a fount of natural resources. However, because of its high level, it also entails related consequences of a negative nature on the ecosystem in general.

We are therefore faced with a paradoxical situation: In search of higher levels of well-being and the satisfaction of his aspirations, man can inflict damage on the environment, which in turn turns against him, affecting his health. That is why this issue of environmental health takes on such singular importance for public health officials and administrators, and it is time to point out the responsibility every health official has in

his respective area of work for seeing that favorable conditions are preserved in this common environment, fighting pollution, the product of social development that is coming about.

Consequently, there is contamination when environmental changes create or can create disturbances or dangers to the public's health, safety or welfare, or when they are detrimental to proper domestic, industrial, agricultural or recreational use, or when they are harmful to livestock, flora, aquatic fauna and other biological species.

After analyzing possible effects on the environment in Havana City Province, we considered that the most serious ones are those occurring in the physical factors of the environment: the aquatic milieu and soil, as the result of the improper disposal and failure to treat industrial, agricultural and domestic waste, in some cases due to the lack of a treatment system and direct dumping into the earth through holes and drains and in other cases, dumping on the very surface of the land because of the functional inefficiency of the system or its insufficient capacity. Various factors have had an effect here, ranging from pressure to put an institution into operation without a complete understanding of future consequences, to a false economic concept of saving money.

Although in past years, health has been of cardinal importance in all measures aimed at improving the environment, there are many cases in which sanitary services are very removed from the main activities concerning with protecting the quality of the environment in the process of industrialization that is taking place.^{1, 2}

Degree of Environmental Pollution

If we agree that the environment is polluted when its composition or state is altered as a direct or indirect result of man's activities, we can consider that in the province, the number of sources of pollution contaminating the water and soil amount to 36, which we shall classify depending on whether they dump waste onto the surface of the water, into superficial or ocean currents or onto the surface of the land.

It is necessary to emphasize the immense danger threatening the Ariguanabo Basin, whose annual volume of extraction is 105 million cubic meters of water to supply the municipalities of San Antonio de los Baños, Bauta, in Havana and Marianao in Havana City, as well as large industries and agricultural and educational centers. It is also interrelated with the Vento Basin, an important supply source for Havana City. This subterranean basin is closed and is part of the Vento-Ariguanabo hydrogeological unit.

The lines of direction of the subterranean flow go from the center of the basin, that is, the area occupied by the Ariguanabo Lagoon, toward the east. It is a calcic basin made up of limestone caverns, above which are layers of clay of varying degrees of thickness. If we add to all the foregoing the fact that untreated waste from industrial, agricultural and

educational centers is being dumped onto the watershed, we shall understand the importance of the application of a correct policy for the use and conservation of this important supply source.

Direct Pollution of Aquiferous Bed

Municipality	Source of Pollution	Current Problem
Bauta	Liquid feed plant Quebrada del Yuro	Dumping of raw waste into the Ariguanabo Lagoon
Bauta	Ariguanabo Textile Plant	Dumping of raw industrial waste into the Ariguanabo Lagoon and the phreatic layer
Bauta	Victoria A and B cattle breeding centers	Dumping of raw waste into the Ariguanabo Lagoon
Bauta	Lazo de la Vega Boarding School	Dumping of sewage from the treatment plant directly onto the watershed
Bauta	Balkan pasturizing plant	Disposal of untreated waste by dumping into the subsoil
Bauta	San Pedrito slaughterhouse	Infiltration into the subsoil of waste from the stabilizing lagoon because of the lack of decompaction
Caimito	Caonao Integral Swine Center	Dumping of waste into a sewer because of incompleted projects
Madruga	B. L. Sta. Coloma Sugarmill	Dumping of untreated industrial waste into sewer
Madruga	R. M. Villena Sugarmill	Dumping of untreated industrial waste into sewer
Nueva Paz	Manuel Isla Sugarmill	Dumping of untreated industrial waste into sewer
Melena	G. A. Manalich Sugarmill	Dumping of untreated industrial waste into sewer
Guines	Friendship With Peoples Sugarmill	Dumping of untreated industrial waste into sewer

Guira	M. Gomez Basic Secondary Farm School	Dumping of raw waste into sewer
San Jose	R. C. Bonilla Paint Factory	Dumping of untreated industrial waste into sewer

Pollution of Superficial Currents

Municipality	Source of Pollution	Current Problem
San Jose	Algibe Pasturizing Plant	Disposal of untreated waste by dumping into stream

The indiscriminate dumping of untreated waste into streams brings about the danger of further contamination because the waters run toward the Mayaguez River Basin.

Contamination of the Sea

Municipality	Source of Pollution	Current Problem
Maríel	Orlando Nodarse Sugarmill	Dumping of untreated industrial waste into Maríel Bay
Maríel	La Boca community	Dumping of domestic waste into bay
Maríel	Shrimp Fleet	Dumping of oil into the bay from bilge
Maríel	R. Arcay Cement Plant	Dumping of untreated industrial waste into Maríel Bay
Maríel	A. Sandino Sugarmill	Dumping of untreated industrial waste into Cabanas Bay
Santa Cruz del Norte	Camilo Cienfuegos Sugarmill	Dumping of untreated industrial waste into the sea
Santa Cruz del Norte	Ron Havana Club Fca.	Dumping of untreated industrial waste into the sea

The sources of pollution corresponding to the R. M. Villena and B. L. Santa Coloma have considerably affected the Bello Springs, a supply source for Matanzas City. In these areas where two sugarmills are located, there is also the potential danger that the El Gato Basin might become polluted if the necessary measures are not taken to preserve it.

Toward the southern part of the province is the Southern Basin, which is seriously threatened by the pollution from the Manuel Iala, G. A. Manalich and Friendship With Nations sugarmills.

The historical evolution of the abiotic state of the Havana City port could be repeated in Mariel Bay because of the sources of pollution affecting it. Furthermore, the number of boats entering and leaving the bay increases daily and it is believed that if measures aimed at controlling this potential pollution are not taken, then in the years to come, we might reach and exceed the critical point. The absorption capability of the marine receptacle is not unlimited and above all, one has to understand that the ancestral and archaic custom of dumping waste directly into the water is an aberration in our time of advanced technology. Direct drainage is naturally the cheapest, but we have already mentioned the dangers it entails. We must not therefore abuse the self-cleansing ability of the sea. Rather, we must contribute to this activity with some primary purification.

It is important to point out the effect that might be caused by community of La Boca's dumping of waste directly into Mariel Bay. Something similar happens with the town, whose waste is dumped directly into the bay without any preliminary treatment.

The danger along the coast of the municipality of Santa Cruz del Norte does not only result from the two industries that now dump their waste into the sea, but rather, from future development as well. Consideration is being given to the construction of a paper and cardboard factory, whose plans already include dumping waste into the sea. An analysis of the problem is therefore needed, not only because of what could happen to marine resources, but also because of the effect on resorts and international tourist centers located in Rotilla, Jibacoa and Bacuranao.

Some technicians have thought that in order to solve the problem, it was enough to dump waste deeper into the sea. The existence of thermoclines was the principal argument given to justify that theory.

Actually, an analysis of observation data and of the many measures taken shows that where thermoclines are stable and deep, intercommunication between the separating masses of water may be minimal. In this case, it might be agreed that deep dumping far under the thermocline is acceptable. However, great seasonal and geographic variations have been observed in thermoclines when they are situated in shallow waters or water of medium depth.

In rough, shallow waters, many thermoclines are subjected to the effects of the tides and are completely ineffective because of their very instability. Nevertheless, many oceanographers still stress that it is very difficult to predict the effects of dumping on the sea.

Pollution of the Soil

Municipality	Source of Pollution	Current Problem
Alquizar	Alquitex Textile Plant	Dumping of untreated industrial waste on the ground in an area near the coast
Alquizar	Dagame I Feed Lot	Dumping of raw waste because of failure to maintain the treatment plant. Waste goes through Alquitex Plant outlet and is deposited along the coast
Alquizar	Ramon Emeterio Betances Basic Secondary Farm School	Dumping of untreated waste into outlet of Alquitex Textile Plant
Caimito	Marine Prefattening Center	Dumping of raw waste in the ground
Bauta	Virana Prefattening Center	Dumping of raw waste in the ground
Quivican	Camacho Fattening Lot	Dumping of raw waste in the ground because of inadequate treatment plant
Quivican	P. Noriega Sugarmill	Dumping of untreated industrial waste in the ground
Quivican	Caribbean Plant	Dumping of untreated industrial waste in the ground
Quivican	P. Noriega Minibrigade Community	Overflow into the ground of waste because of inadequate disposal system
Maríel	Naval Officers School	Overflow of absorbant tanks because of insufficient capacity of treatment system
Guines	Guinera Factory	Dumping of waste in areas around plant because of inadequacy of system
Guines	Juan Borrell settlement	Dumping of domestic sewage into the ground because of lack of treatment plant or final disposal

Batabano	Batabano Cannery	Stagnation of sewage because pipes crossing town cannot empty into the sea
San Jose	Babiney Community	Dumping of waste into the ground because of lack of treatment system or final disposal
San Nicolas	P. Troya Community	Dumping of waste into ground because of obstructed outlet

The situation that occurs with pollution at the surface of the ground is alarming and even more so because infiltration carries waste to phreatic layer. The problem of the municipality of Alquizar is notorious because the area affected by pollution amounts to approximately 4 square kilometers, which means the gradual destruction of the flora and fauna in the occupied area because of the stagnation of waste waters. Drainage canals in the zone are polluted, the air is heavy with a strong, fetid odor and the area is a permanent source of disease-carrying organisms.

All of this may gradually increase the pollution of channels used by the plan to breed carp and due to the proximity, the continental shelf waters may be involved, with the resultant effect on lobster and fishing plans and the resort area of Guanimar Beach. These predictions are based on the aggressiveness of the waste materials, not only from the bacterial standpoint, but from the chemical angle as well. Among the substances discharged are caustic soda, detergents, sodium carbonate, ammonium phosphate, acetic acid and organic dyes from the Alquitex Textile Plant.

While the situation in the municipality of Alquizar is a matter for concern, that existing in the municipality of Mariel is grave because of the epidemiological risk involved, a product of the pollution of the water supply. The suspicious origin of this situation is the stabilization tank at the Naval Officers School, located 200 meters from the aqueduct wells. Because of inadequate absorption, there is an overflow of waste which is even more serious because of the small size of the basin.

It should be considered that the rest of the problem results from the potential danger of the Southern Basin. Its waters are constantly threatened because of the infiltration.^{3, 4, 5}

Possible Consequences

It is usually difficult in practice to obtain quantitative information on exposure and response in man, especially with respect to chronic effects, when the exposure is low-level and prolonged. Concerning risks, attention centers on harmful effects to human health and damage to the environment due to the poor use of treatment systems or a lack of such systems. From earliest times, there has been an understanding of the potential function of land and waters that are polluted in transmitting diseases from person

to person. A palpable example are the outbreaks of typhoid fever caused by contaminated water in the cities of Camajuani and Camaguey and the outbreak of diarrhea in the town of Cayo La Rosa caused by contamination of the water supply.

Equally well-known is the index of infection caused by enteric protozoans due to pollution of the soil. This sets up a man-soil-man cycle and an animal-soil-man cycle (zoonosis communicable to man), as in the case of leptospirosis, which constitutes a potential risk as a contaminant.

Of significant importance is the quantity of hotbeds of vectors, mainly mosquitos, which the province has as a result of the dumping of waste on the surface of the ground, as in the case of the municipalities of Alquizar, Batabano, Caimito and Bauta, to give but a few examples.

Results have also been negative from large oyster breeding in Cabanas, affected by likely pollution of the area by the A. C. Sandino Sugarmill, which has caused the death of oysters and possible bacterial contamination of shellfish along the Mariel coast and the Alquizar and Batabano coast. In addition, there is the possible transmission of typhoid fever, a fact observed in 1880 by Cameron, due to the poor quality of oysters caught in Dublin Bay, and confirmed in 1895 by Wilson in Naples.

Contrary to what happens in the case of infectious diseases, whose agent is a live organism and whose incubation and prognosis are well-known, nonliving pollutants are much more subtle and have long-range consequences in which there is a great distance between cause and effect. Furthermore, they are much more persistent in the milieu than live infectious agents.

Finally, what is even more important is the fact that new chemical products for agricultural or industrial use are appearing every year and their types, complexities and scope are steadily increasing. The great toxicity of some is known but their long-term effects remain to be determined.

Measures Considered

In order to remedy this confusing situation, a number of firm steps aimed at protecting the environment have already been taken. They include the establishment of a special commission by the National and Provincial Assemblies of the OLPP. Nevertheless, we believe that the application of sanitary ordinances and the establishment of a methodology through the bank are of fundamental and decisive importance, for the builder and investor will be forced to comply with the law under penalty of prosecution. To date, there has been strict compliance only with the approval of smaller projects, but there are constant violations with the presentation of proposals for approval by sanitary authorities and in many cases, work is begun with designs only partially completed and without awaiting the inhabitability license. There is pressure to violate requirements and other considerations are alleged which only an understanding and

application of the laws will resolve. A final solution of the existing situation would result from: 1) the reactivation of processing plants already in existence, ensuring their maintenance; 2) at sugar mills, the establishment of stabilization tanks for waste from industrial processes and the use of recycled water; 3) at textile plants, chemical treatment (pH control), plus a reduction in color by activated charcoal and a stabilization pond (if ponds are not used, biological filters and even better activated charcoal can be utilized); and 4) the construction of treatment systems in all educational, agricultural, industrial or communal institutions.⁶

BIBLIOGRAPHY

1. Report of a WHO committee of experts. "Public Waste Water Evacuation Services." Series of technical reports No 541, Geneva, 1974.
2. Report of a WHO committee of experts. "Sanitary Aspects of the Fight Against Environmental Pollution, Planning and Execution of National Programs." Series of technical reports No 554, Geneva, 1974.
3. Shuval, Hillel: "Study of Aspects of Soil Pollution Relating to Public Health." BOLETIN DE LA OFICINA SANITARIA PANAMERICANA, Vol LX 4, No 3, March 1971.
4. Hollis, Mark D.: "Man and the Cities in Which He Lives." BOLETIN DE LA OFICINA SANITARIA PANAMERICANA, Vol LXX, No 5, May 1971.
5. Clarke, G. L.: "Elements of Ecology," Chapter II, "The Environment."
6. Brison, J.: "Measures To Be Implemented To Ensure Public Health on the Mediterranean Coast. Sanitary Aspects of Pollution," CUADERNO DE SALUD PUBLICA, No 62, WHO, Geneva, 1975.

11,464
CSQ: 5000

ENVIRONMENTAL PROTECTION LAW DRAFTED

Kaduna NEW NIGERIAN in English 6 Jun 80 p 24

[Excerpt]

AN environmental protection law for the country has been drafted and will soon be promulgated.

The Minister of Housing and Environment, Dr. Wahab Dasunmu, announced this yesterday in a nationwide broadcast to mark World Environment Day.

He disclosed that environmental impact assessment would be made mandatory before approval of major projects in the Fourth National Development Plan, while the enforcement programme of the environmental protection legislation would come into effect during the plan period.

The minister indicated that Nigeria might participate in the regional sea studies of the Gulf of Guinea together with other African nations in the region to protect the marine environment and natural resources in the area.

Besides, Dr. Dasunmu further disclosed, his ministry would shortly begin to implement some programmes in protecting the environment against oil spillage, while it would continue to liaise with the states in major areas of their environmental problems, particularly, with regard to those of refuse and other solid waste management.

He earlier spoke of uncollected refuse and indiscriminate dumping and open burning of toxic and non-toxic industrial and domestic wastes which, he said, constituted serious sources of pollution to the land, the air and to the water resources "from where we derive our domestic water needs."

CSO: 5000

WHITE PAPER ON ENVIRONMENTAL CONSERVATION ISSUED

Johannesburg THE CITIZEN in English 14 Jun 80 p 8

[Text] THERE is a need for the rationalisation of existing Acts, regulations, ordinances and by-laws on environmental matters, says a Government White Paper tabled yesterday.

The White Paper on a National Policy on Environmental Conservation was tabled by the Minister of Water Affairs, Forestry and Environmental Conservation, Mr Braam Raubenheimer.

It says that to promote Government attention to environmental matters there is a need for such rationalisation.

"This development pattern in regard to legislation should be seen in the light of the ultimate aim being pursued, namely, the creation of institutions and practices to ensure that Government will in future accord sufficient attention to the environment to ensure a healthy balance between development and environmental conservation.

"At present various aspects of environmental conservation receive varying amounts of attention from several institutions, but some, such as the combating of noise and solid waste management, receive rela-

tively little attention."

It proposes an Environment Conservation Act to create the necessary machinery to achieve this aim.

"The proposed Act will therefore be the first step towards the rationalisation of environmental legislation and will provide for the creation, amongst other things, of a statutory council for the environment and the necessary machinery for the combating of noise and littering and the control of solid waste.

"The envisaged legislation is not intended to encroach upon the characteristic functions of other departments."

The White Paper says further legal powers or steps which may be required will receive the attention of the new council for the environment on a continuous basis.

Because the quality of the environment at present and in the future will to a great extent determine the quality of life in the Republic, it is necessary that in the comprehensive process of rationalisation the aim should be a Government department which will eventually be equipped to deal with all aspects of the environment on a co-ordinated and comprehensive basis.

"This could best be achieved by apportioning overall responsibility for environmental conservation

and promotion in its entirety to the Department of Water Affairs, Forestry and Environmental Conservation.

"This means that a new focus for central government attention has made its appearance as a result of the need created by rapid development."

LAUNCHING OF AFFORESTATION PROJECT REPORTED

Lusaka TIMES OF ZAMBIA in English 19 Jun 80 p 5

[Text]

THE Government has launched a major afforestation programme in Kabwe Urban to boost the construction sector.

The programme, which also involves installation of timber treatment tanks will cost more than K30,000.

This is contained in a progress report submitted to the district development council meeting by the forest department which says that work had already started.

It indicates that apart from the construction sector other beneficiaries of the project would be schools and farmers for whom more than 29,700 pots of pine seeds had been sown at Mpima.

It explains that already ten hectares out of the total 30 hectares of land had been cleared and planted with eucalyptus trees to ensure self-sufficiency in the supply of timber.

At the same time, forest protection and management scheme to cut back growth of national and local forest boundaries in the district had been earmarked at Mpima, Munyama, Kalulu, Kamakuti and Kafulagase.

The report adds that of the total cost of the programme, K15,000 would be spent on purchasing and erecting a tank at Mpima to be used for the treatment of timber.

The forest department was one of the only two Government agencies which presented progress reports at the DDC meeting — the other was agriculture.

This angered governor, Mr Raphael Mapulanga, who rebuked Government departments and parastatal organisations for apathy towards the development of the area.

According to another report, the department of agriculture would spend K48,000 this year on building staff houses and buying one vehicle.

CSO: 5000

SOKOLOVSKY COMMENTS ON COST, NEED FOR ENVIRONMENTAL PROTECTION

Moscow MOSCOW NEWS in English No 22, 1980 p 10

[Interview with Valentin Sokolovsky, vice chairman of USSR State Committee for Hydrometeorology and Environmental Control, by Olga Martynenko; date and place not given]

[Text] The 300 experts from 50 countries who met in Paris in 1968 under the aegis of UNESCO warned mankind that the changes it has introduced into the biosphere are leading to a dangerous evolution of the environment in which life originated and developed.

Over the past few decades the interrelations between man and nature have been attracting the ever keener and ever more apprehensive attention of scientists, state institutions and laymen. Parties of friends of nature have been set up in some countries, which nominate their candidates at elections. Even the Vatican has declared Saint Francis of Assisi, who is known for his care and concern for animals and love of nature, to be the patron saint of the environment.

Environmental protection is the subject of the talk our correspondent had with Valentin Sokolovsky, Vice-Chairman of the USSR State Committee for Hydrometeorology and Environmental Control.

Q: People in the West often say that the ecological crisis is the result of a sort of "Faustian deal," i.e., it is the price which man has to pay for scientific and technological progress. Are more reasonable relations between man and nature possible?

A: Briefly speaking, yes, more harmonious relations of man with nature are both possible and necessary. However, the concept of the ecological crisis being the result of scientific and technological progress contains, as I see it, a number of flaws.

Firstly, the very term "the ecological crisis" is not quite accurate. What we see at present are signs of ecological disbalance which could indeed snowball into a crisis if due measures are not taken. And ecological disbalance in itself is to a great extent of a regional nature and is determined by social, historical, natural and economic specifics, and by the level of development in the economy, science and technology.

Secondly, natural catastrophes which led to the extinction of many animal and plant species and to the disintegration of ecological systems occurred even before man appeared on earth. This, naturally, does not relieve man of responsibility for subsequent detrimental influences on the environment, especially at the present stage in society's development. However, technological progress which has, for example, resulted in the pollution of the world ocean by oil products and lead, in the increased content of carbon dioxide in the atmosphere of the earth, in affecting its ozone layer, etc., has not only brought us ecological problems which, strictly speaking, are inevitable. The scientific and technological revolution has also opened new opportunities for dealing with these problems.

Q: What are these opportunities?

A: Technological progress has made it possible to use processes in industrial production which produce little waste and no effluents, enable us to utilize natural resources comprehensively and economically. Science has increased our ability to forecast the possible consequences of man's economic activities, so that we can now solve the dual problem of securing the necessary development rates in the economy and of guaranteeing the minimum detrimental effect on the environment.

Q: How is this problem being solved in our country?

A: The need for environmental protection and improvement is written in the USSR Constitution. Nature protection is guaranteed by the legislation on health protection, on mineral wealth, on forests, waters and land. Draft laws on the protection of the atmospheric air and of the animal and plant kingdoms are now being considered. The governmental decisions taken in 1972 and 1978 on measures for increasing nature protection and making more rational use of natural resources set out the responsibilities of the ministries and departments and clearly formulate environmental control tasks.

Q: What is the real effectiveness of these resolutions?

A: First of all, they are being reinforced by state allocations for nature protection. Capital investments in this field alone have totalled some 11,000 million roubles in the current five-year plan. The money is spent mainly on the construction of gas-purifying and dust-trapping systems and of water pollution control stations. And if we take into account other spending, such as that for the maintenance and overhaul of nature protection installations and for the care of forests, fish and other wealth, then the total sum spent in the five years will be about 25,000 million roubles.

The improvement in technological processes has led, for example, to more than a third of sulfuric acid produced in our country being obtained from industrial waste. The amount of water conserved annually in industry is equal to three quarters of the annual flow of such a river as the Volga.

This is because some 65 percent of the water used by industrial enterprises is recycled. The rivers of the Baltic, Black, Azov and Caspian sea basins have become cleaner. The changeover to the use of natural gas in factories and boiler-rooms leads to cleaner air.

Of course, it is too soon to declare that all the problems have been solved. Some economic managers are still passive, negligent or simply reluctant, at times, to abide by the scientifically substantiated nature protection measures. As a rule, such occurrences are sharply criticized in the press, for publicity is a reliable guarantee that the shortcomings will be rectified.

Q: The Final Act of the Helsinki Conference specially stressed the role of international cooperation in environmental protection. How does the USSR take part in this cooperation?

A: Soon after the Helsinki Conference the USSR proposed that an all-European meeting be held on this subject. This led to the high-level meeting within the framework of the ECE on the Protection of the Environment last November in Geneva. Resolutions regarding trans-border air pollution and technological processes producing little or no waste were adopted. This February the senior government advisers on environmental problems from the ECE countries met in Geneva and approved the plan of action for the fulfilment of the resolutions of the all-European meeting. At present the participating countries of which the USSR is one, are preparing reports on the strategy and policies of the states to lessen the pollution of the atmosphere by sulfurous acid anhydride, which will be summarized and considered by the temporary executive organ in October.

I took part in the preparations for and in the work of the all-European meeting, as well as in the February session of senior advisers, and I would like to make a special point of the constructive atmosphere of goodwill characteristic of the meeting.

Q: Is such cooperation maintained with the developing countries?

A: Yes, indeed it is, and mainly in keeping with the United Nations Environment Programme. The Soviet Union has organized courses for representatives of the developing countries on the questions of checking the advancement of deserts, and the problems of comprehensive utilization of arid lands are being elaborated. At present the programmes for cooperation in protecting the environment from the influence of the chemical, aluminium, automotive, microbiological, iron-and-steel and non-ferrous metallurgy industries are being considered. It is planned to arrange an international seminar this year in the USSR on the study of the criteria for the siting of industrial projects with environmental factors being taken into account.

Q: In other words, the global nature of the environment presupposes global efforts for its protection?

A: That would certainly be the most productive way. Soviet Academician Vernadsky wrote, half a century ago, that man has realized for the first time that he is a resident of the planet, and that he can and must think and act not only in terms of a separate personality, a family (a clan), a state or an alliance of states, but also on a global scale.

CSO: 5000

NORDIC MANUFACTURERS WEIGH COMMON TOXIC WASTE SITE

Helsinki HUFVUDSTADSBLADET in Swedish 22 May 80 p 19

[Text] The Nordic federations of industries, mainly in Finland, Norway and Sweden, are now discussing the possibilities of building a common facility for the destruction of environmentally dangerous wastes, according to HUFVUDSTADSBLADET's correspondent Olle Ekstrom in Stockholm. At the Central Association of Industries here in Helsinki surprise was expressed over such a concrete assertion, and it was thought that the Swedes may have reverted to wishful thinking.

"The question has certainly been the subject of a discussion by our board a little more than 1 month ago, but nothing was decided or announced," said Aarno Kavonius, graduate engineer and secretary for environmental matters in the Finnish association.

He understands the Swedish interest in a common site since the question of building an installation in Sweden has until now been stalled by objections from local authorities and the Federation of Swedish Industries. A Nordic installation in Sweden--Närke and Kramfors in Västernorrland have been mentioned as alternative sites--would have two advantages from the Swedish viewpoint:

--costs would be shared with other countries, and

--a common waste disposal facility should, according to a spokesman for the Federation of Swedish Industries, be an excellent project for the Nordic Investment Bank.

A factor which obviously is not taken into consideration in Sweden, however, is that transportation costs for toxic wastes can easily amount to over 50 percent of the expense of destroying the wastes.

Denmark surely has no interest in the matter, since they have already constructed their own waste disposal facility where the Danes can offer their own under-utilized capacity.

According to reports from Sweden the interest in a common facility is judged to be great in Sweden and Norway, and somewhat less in Finland.

The Finnish interest should more correctly be classified as nonexistent, since work on a Finnish waste disposal facility is well advanced. The best location for such a facility is now being sought. Twelve places have been considered.

9287

CSO: 5000

BRIEFS

MERCURY DANGER DISCOUNTED--Helsinki, 23 May--The amount of mercury content in the waters of eastern Finland is insufficient to constitute a health hazard. This is the conclusion of a joint investigation conducted by the Board of Health and the Water Board last year. The report of the investigation, which was released by the two government offices on Thursday, said that the information of one and one-half years ago about high mercury content gave a faulty picture of the health risks of using the water in eastern Finland. In September, 1978 a report was released based on investigation of snow and subsoil water which generated alarm about the mercury content of the water in eastern Finland. The latest investigation could not verify the existence of the previously reported high mercury content. Because the mercury was found to be high only on that occasion, there is reason to believe that at least a part of the test samples were contaminated at the time of the tests, it was said. The findings in the autumn of 1978 caused the health and water authorities to carry out a more comprehensive investigation than before. It was conducted last year, when the mercury content of household water, subsoil water, snow, streams and rivers, people's hair, livestock, and fish were investigated. [Text] [Helsinki HUFVUDSTADSBLADET in Swedish 23 May 80 p 13] 9287

CSO: 3000

STORTING GRANTS FUNDS FOR OCEAN FLOOR OIL DAMAGE STUDY

Stockholm NORDISK KONTAKT In Norwegian 22 Apr 80 pp 488-489

[Article] "Fight against Pollution of the Bottom of the Sea"

[Text] Test project to be started. Pollution of the bottom of the sea is a problem which all coast states are struggling with. It is a fact that most oceans are now strongly polluted and that the bottom of the sea gradually becomes more and more filled up with garbage.

The problem is especially big in those countries which also conduct oil activity outside their coasts. It has to a high degree also struck Norway.

This was the reason why parliament (24 March) appropriated 10 million kroner for a test project on the Viking Bank and on Revkanten. These are areas which are polluted as a consequence of the oil activity.

Other available methods will be used to remedy the pollution. Fishing boats with special trawls and sonar will be used in the work.

Strong Reaction

"The authorities will react strongly when we discover cases of pollution of the bottom of the sea and find out who is behind the pollution," maintained Oil and Energy Minister Bjartmar Gjerde. Nothing will be saved to get the upper hand over this evil. The goal must be to clean up where the pollution has gone furthest, and to employ effective means to prevent new pollution. It is a difficult and time-consuming work, but we cannot give up.

Erland Asdahl (Center Party) believed that the oil companies, which are responsible for the majority of the pollution, can afford to clean up after themselves. He therefore voted against the appropriation.

To this Cabinet Minister Gjerde replied that the government in spite of everything would have to take up this work regardless of who had thrown the garbage or neglected to clean up.

Both the cabinet minister and other speakers, however, emphasized that the "owner" of the garbage should pay.

Abandoned Oil Installations

Odd Vigestad (Christian People's Party) believed it was a much bigger problem with abandoned oil installations as the companies gradually leave fields which are emptied.

"The law must be understood in such a way that the companies will remove all such installations and clean up the bottom so that a basis for the fisheries can be reestablished in the big fields which have been seized for many years," he said. "This absolute requirement must be included in all licenses."

Vigestad reported that a British oil rig was removed in 1979. It cost more than the investments which were made in the installations. It therefore does not involve small amounts of money, and we must realize that when the tax rules are to be formulated. Otherwise we risk that the government is left with the expenses.

The Fishermen Lose

Claus Feyling (Conservative Party) reminded us that the fishermen have been the losing party with respect to the oil activity.

Alf Bjørnø (Labor Party) said that not all garbage at the bottom of the sea was due to the oil activity.

"To prevent pollution is better than to clean up afterwards," says Anders Talleraas (Conservative Party). He asked for strict enforcement of the rules in prospecting for oil north of 62° latitude.

Hanna Kvanmo (Socialist Left Party) asked that the bill be sent in those cases where one finds out who is responsible for the pollution.

Asbjørn Haugstvedt (Christian People's Party) had a similar opinion.

"Cleaning up will increase the fishermen's income in these areas by 10-15 million kroner," maintained Reidar Due (Center Party).

8958

CSO: 5000

SWEDEN

RIKSDAG COMMITTEE: HALT CADMIUM INCREASE IN SOIL.

Stockholm DAGENS NYHETER in Swedish 30 May 80 p 8

[Text] The cadmium content in Swedish arable land cannot be permitted to increase. If the present augmentation continues, a large part of the population will be threatened with liver and kidney damage.

It is the Agricultural Committee of the Riksdag which warns against such developments in a report which was submitted on Thursday.

Cadmium occurs as an impurity in phosphate fertilizers. The use of artificial fertilizer is an important cause of the increase in the cadmium component in the soil, and a study has been initiated for the purpose of discovering a method of purifying the soil.

In the administrative Province of Kristianstad, the highest cadmium contents ever found in Sweden have been measured recently in an analysis of the wheat harvest.

In Blekinge, elk meat has been condemned as food for humans because of the high cadmium content in their kidneys and livers.

Now the Agricultural Committee is proposing that purification measures be taken in regard to the phosphate which is contained in commercial fertilizer. The first research reports concerning possible purification methods are expected by the end of the year.

Why Not Prohibit It?

Why, then, is cadmium not prohibited if it is so dangerous? It is a substance which is so widely distributed that it would prove impossible to push through a prohibition of it, Professor Lars Friberg of the Natural Conservation Department believes.

"Cadmium is actually spread in so many different ways--by being discharged into the air and the water by industrial plants and central refuse disposal plants, through fertilizers, etc.--that the problem has to be tackled by the use of a number of different methods. Applying purification measures in the production of artificial fertilizer would be a good place to start," says Lars Friberg.

So far, the cadmium content in Swedish arable land has doubled during the last 40 to 50 years.

As an indestructible chemical element and heavy metal, cadmium is readily accumulated in arable land and gradually picked up by plants under cultivation, such as wheat plants, and also by fodder plants. When the farming products are eaten by humans and animals, the cadmium is concentrated primarily in the liver and kidneys, and if the content there becomes too high, it can cause serious damage. The first symptom usually is secretion of albumen in the urine.

Up to the present, they have figured on 200 parts per million—that is, 200 milligrams of cadmium per kilogram of renal cortex—as constituting the critical value for the causing of damage, but that is quite uncertain.

Human resistance—and the human propensity to accumulate cadmium—are thought to vary considerably. A rather large proportion of the Swedish population has accumulated very small quantities of it up to the present—25 parts per million, or something like that.

Tobacco is also an important source of cadmium. Smokers who smoke a package of cigarettes a day get fully half of their total intake of cadmium in that way. Nonsmokers avoid that.

9266

CSO: 5000

SWEDEN

SEAL POPULATION RISES IN GULF OF BOTHNIA

Stockholm DAGENS NYHETER in Swedish 5 Jun 80 p 64

[Text] Sundsvall, 4 Jun--Gratifying reports on the gray seal species in the Gulf of Bothnia are being received. For years people have feared that the gray seals were on the point of being wiped out up there, but now many more seals have been seen than in many years on the drift ice off the Pite-Skellefte coast. The observations were made when Coast Guard vessel TV 104 was out on patrol duty and Coast Guardsman Anders Nordberg took the above picture for DAGENS NYHETER. His report follows.

"During the Whitsun holiday, we were out on a routine patrol mission with Coast Guard vessel TV 104 in the Swedish fishing area between Holmsund (Umea) and Maloren, in the northern Gulf of Bothnia.

"In the waters between Skellefte and Pitea, there was heavy drift ice in some places.

"There were seals there in numbers we had not seen before. We counted up to 20 to 26 gray seals of various ages and sizes within our field of vision.

"The seals are at the top of the ocean's food chain and people have said that the female seals become sterile or miscarry because poison and heavy metals are spread about in the ocean and accumulate in the seals' bodies. This time we saw a number of young animals--calves--and that contradicts that statement to some extent, anyway. They are ordinarily born in February, and they now weigh from 70 to 100 kilograms.

"Coast Guardsmen with many years of experience with seals--that is, even from the time when the number of seals was large and before they were put under protection--think that the downward trend has been reversed and that the number of seals is increasing.

"They also think that the seals we saw on that occasion were behaving entirely normally, and they looked fat and well.

"Every time the Coast Guard observes seals a report is sent to the Naturhistoriska Riksmuseet [Swedish Natural History Museum]. The location, type, number, size, behavior and injuries, if any, etc., are given in the reports.

"All dead seals found by the Coast Guard are sent to the Naturhistoriska Riksmuseet. The seals are observed there to ascertain the cause of death, among other things."

The administrative province's organization for the protection of game in Vasterbotten, itself, has not carried out any studies in previous years which could give documentary support to the Coast Guard's observations.

"But we naturally believe their report and think it is very gratifying," administrative province gamekeeper Evald Hellgren told DAGENS NYHETER. "In the past, we have found dead seals every year with PCB and DDT, above all, in their bodies."

9266

CSO: 5000

SWEDEN

BRIEFS

OIL SPILL CLEAN UP--Sjon Trekanten, between Liljeholmen and Grondal in Stockholm, is being put into shape for the sum of 1 million kronor. The bottom has been cleaned of old bicycles and perambulators and now the entire bottom is being treated chemically with calcium nitrate so that the sediment on the bottom will oxidize and combine with the large amounts of phosphates which are in the process of turning the lake into a dead body of water. The Sjon Trekanten has an outlet to the Liljeholmsvik through a culvert, but the inflow is in the process of suffocating the lake and changing it into "algae soup." Instead of pumping up the nourishing sediment as was done with the Sjon Trummen in Vaxjo, they are pumping calcium nitrate down by means of something like a harrow driven by compressed air which operates on the bottom. The harrow is dragged by a raft which pulls itself back and forth over the lake's surface by means of a line which is made fast ashore. The work is being done by Atlas Copco and it is expected to be finished in June. At the same time, the bottom of the lake closer to Liljeholmen is being cleaned of wood chips and sawdust by pumping the sediment on the bottom ashore and letting it run back through a straining net. [Text] [Stockholm Dagens Nyheter in Swedish 23 May 80 p 15] 9266

CSO: 5000

END

END OF

FICHE

DATE FILMED

July 31, 1980

Debbie